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USER'S MANUAL
JOVIAL COMPILER VALIDATION SYSTEM

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July 1970

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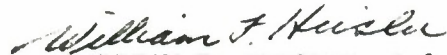


FOREWORD

The JOVIAL Compiler Validation System (JCVS) Users Manual is intended as the reference manual for on-site operations.

The system was developed as a part of Project 6917 under Contract F19628-68-C-0301 for the Electronic Systems Division (AFSC) by Data Dynamics, Inc., Los Angeles, California 90045. The project monitor was Captain Martin J. Richter, ESM DA. The work was performed during the period March 1968 through February 1969.

This technical report has been reviewed and is approved.



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ABSTRACT

This technical report consists of detailed specifications for the use of the JOVIAL Compiler Validation System (JCVS). The system is designed to measure the compliance of a specific JOVIAL J3 compiler against the language specifications in Air Force Manual 100-24, "Standard Computer Programming Language for Air Force Command and Control Systems". This report describes the card input formats, deck structures, tape requirements, test modules, and operator procedures required to use the system.

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SECTION I

INTRODUCTION

The purpose of this manual is to :

1. Introduce the JOVIAL Compiler Validation System
2. Describe how the system may be used to validate JOVIAL Compilers

This manual is organized into five sections. Following Section I, the Introduction, Section II describes the JOVIAL Compiler Validation System. Included in this Section is a brief discussion of the current JOVIAL J3 Standard, the AFM 100-24 document, some insight into the design criteria which guided the development of the system and a discussion of the functions performed by components of the system. Section III suggests how the JCVS may be used as a package to validate JOVIAL compilers. Section IV presents the details of each of the system components. Sufficient material will be included in this section to completely describe the uses of each component in the system. In addition, details of programs and their relationship to data are fully described.

Although the AFM 100-24 document defines specific input/output statements for the JOVIAL J3 language, discussions with implementors of this language have established that of the existing JOVIAL compilers none have adhered to these input/output specifications. Most current JOVIAL compilers use either the input/output capabilities provided by the operating system in which JOVIAL is embedded or an associated ancillary system within the software environment. There is currently little control over the form of the JOVIAL associated input/output statements. In addition only the GE-635 JOVIAL Users Manual is currently available. These two facts when taken together present considerable difficulty to those JOVIAL support statements that concern themselves with printing the results of the execution and comparison of JOVIAL test statements. Until a firming of the input/output specifications to the JOVIAL language has been established, this fact is a major obstacle to the successful usage of this system.

Section V will discuss the JOVIAL Compiler Validation System as it applies to the five computers upon which the system will reside. Because of the absence of information relating the JOVIAL compiler to its operating system, the requirements relating the two will be discussed in general terms only. This section will describe how the JCVS must be used by defining input deck structures and tape mountings, providing the required instructions to operate the system, and giving examples of the results obtained from the various modules comprising the JCVS.

SECTION II

SYSTEM DESCRIPTION

The JOVIAL Compiler Validation System (JCVS) is designed to evaluate the extent of compliance of any JOVIAL compiler with the current JOVIAL Standard Computer Programming Language for Air Force Command and Control Systems Manual, AFM 100-24.

Depending on the extensiveness and depth of testing, the user may either select a representative collection of test statements or the complete test repertoire. If the user is interested in a particular capability as provided by the JOVIAL compiler, he may desire to execute test statements exclusively in the area of that particular capability.

Having decided upon the particular collection of test statements to be executed, the user specifies his intent to the JCVS by means of test selector cards. These cards are interpreted by the JCVS and are used to select the desired test statements to be included in the generated test program. The resulting JOVIAL test program will be produced for compilation in card image form on magnetic tape or on cards.

2.1 The JOVIAL Standard

The JOVIAL J3 language is completely specified in AFM 100-24, Standard Computer Programming Language for Air Force Command and Control Systems, 15 June 1967. The JOVIAL language has the basic elements required by most languages, namely, the ability to define simple data items and basic item structures and the capability to reference this data from within procedural statements. The procedural statement repertoire is adequate, consisting of the following procedure types:

1. Data Transmission
2. Algebraic Expression Formulation
3. Logical Expression Formulation
4. Transfers of Program Control
 - 4.1 Conditional
 - 4.2 Unconditional
 - 4.3 Switching
 - 4.4 Looping
5. Input/Output

There are other adds and ends in the language that are useful but computer dependent and serve to confound the intent of this specification, namely, standardization.

Another section of this manual is devoted to establishing standards for the development of compilers of JOVIAL J3. Elements of this standard are, on occasion, ignored by the implementors of the language. This is particularly true in the case of the input/output specifications provided by the language. These specifications are rudimentary in character and are, generally, replaced by comprehensive (but non-standard) input/output procedures more closely associated to the operating system within which the compiler is embedded. Unless a more stringent attitude toward the development of JOVIAL compilers is maintained it is impossible to write JOVIAL input/output statements with the conviction that they will be compatible from one computer-compiler configuration to another.

For purposes of this system, the entire JOVIAL language will be treated as a single module. Because of the size and pointedness of the language, no submodularization will be required.

2.2 JCVS Testing Concepts

The following sections discuss briefly the scope of the JCVS and the tests selected for inclusion in the Population File.

2.2.1 JCVS Scope

For purposes of the JCVS, the JOVIAL system to be tested is assumed to consist of a processor that compiles standard JOVIAL source program statements called the JOVIAL compiler, and all programs and subroutines used by the JOVIAL object code generated from standard JOVIAL statements. The JCVS is designed to test both the compilation and execution of specific JOVIAL features.

2.2.2 Data Concepts

JOVIAL language organization has guided the identification of language features to be tested. In order to validate the JOVIAL compiler ideally, each of the specific language features must be validated. The validation of each feature of a language, however, is not always possible. For example, how can one determine that any value stored in a floating point item is truly stored as a floating point number; how can one determine that a fixed point constant has actually been converted to a fixed point binary point constant. Looking at information as it resides in the internal storage medium, we may observe a string of bits, however, the interpretation of this content is inconclusive. Consequently, some of the features provided by the JOVIAL language are not susceptible to validation independently. These features are generally the more basic notions in the language and will be used constantly in the Test Modules comprising the Population File. With repeated correct usage of these basic concepts, it is hoped that the credibility of their required implementation will be considerably improved.

With these thoughts in mind, the following aspects of the data definitional capabilities of the JOVIAL language will not be tested independently and will be assumed present in the language and correctly implemented:

1. The ability to specify any item type and have it retained according to its defining attributes.
2. The ability to formulate any constant type and have it retained according to its defining attributes.
3. The ability to specify any data structure type (table, array, etc.) and have it retained according to its defining attributes.

The JOVIAL language provides the user with a myriad of options to form constants, simple items, tables, and arrays. There are so many data defining attributes possible in JOVIAL that exercising each option in an independent test is quite impossible. As a compromise, the test repertoire will use a subset of data definitions that exercise, at least once, all of the data attributes available to define data items and structures. In addition, the repertoire will utilize every variation provided to formulate constants with the exception of the dual item definitions which will be exercised in part, only. It goes without saying that the formation of acceptable JOVIAL symbols (names, labels, etc.) will be exercised every time a symbol is formed.

2.2.3 Procedural Concepts

The JOVIAL language provides the user with the ability to process formulas and relations; it provides for program organization and it provides certain compiler directing features. Every variant of each of these features will be tested at least once. Further substantiation of the ability of a feature to perform its intended function will be supplied by its correct use as a support statement in other test modules.

With these thoughts in mind, the following aspects of the procedural capabilities of the JOVIAL language will be assumed to be present in the language and correctly implemented:

1. The ability to name a statement with a label.
2. The fact that normal procedural control passes from one JOVIAL statement to the next.

Comprehensiveness

The variants provided in the data base form a nucleus from which tests may be created. Selected data statement variants and all procedure statement variants will be included in the data base. Selected values for variant operands will also be a part of the data base. Since the collection of values comprising the complete range for each variant operand may be extremely large, only a representative number of values for each operand may be included. These factors, of course, indicate that individual variants may be tested only for a subset of their possible operand values.

This subset of operands will be large enough, however, to associate a large degree of confidence with the evaluation of each variant.

A JOVIAL compiler is said to be validated if each individual data base variant with its appropriate subset of operand values has been executed and results compared successfully. The collection of variants and operands on the data base necessary to validate the compiler will be referred to as the "nominal" data base. The JOVIAL source test program that may be used to validate the entire JOVIAL compiler is called the nominal "test case".

The design reflects the following:

- a) A careful sampling of selected operands from possible combinations of operand types available to the statement.
- b) No tests are made of erroneous statements.
- c) All possible variants of procedural statements are performed.
- d) Tests are not designed to indicate how a function is implemented. Thus, there is no attempt to distinguish between efficient and inefficient implementations.
- e) No testing of non-standard extensions to JOVIAL is made. However, such tests and extensions can be added to the system by the user through the add, change and delete option cards in the Population File program.
- f) No test of direct code is attempted.

Openendedness

Modification to the data base may become necessary as changes are made in the JOVIAL Standard. Variants and operand values may be added to the data base to test user-specific extensions to the JOVIAL language. Variants and operand values may be deleted or modified because of reinterpretations of existing JOVIAL language features. The JCVS will provide the means to add, change or delete any data base variants and operand values in the Population File.

Ease of Use

Complete and detailed input and test configurations facilitate ease of use. In Section 4 the input cards to each program are described in detail. Each input card is defined, card columns are specified, and all mandatory cards are so designated. In Section 5, the order of all the cards from each program needed for a JCVS run is graphically portrayed. The collection of test statements provided by the JCVS is shown in Appendix 6 together with their individual test serial numbers. The test serial number permits the user to select, eliminate or add specific tests.

Additional features that make the JCVS easy to use are:

- a) A test can be specified by a user without detailed knowledge of JOVIAL.
- b) Test Results which show discrepancies are output. An option exists for viewing an indication of the results of all tests (see Section 3.5).
- c) Program modules are machine independent.

2.3 JCVS Computer Program System Capabilities

The JCVS consists of a collection of three major program modules and a data base that provides the user with a simple technique to generate a JOVIAL source program capable of testing some particular aspect of the compiler or the entire compiler itself. The data base, called the Population File, contains all of the test statements that are potential candidates for inclusion in subsequent generated source programs. A particular test may be created including specific functions and excluding those functions that are not provided, for one reason or another, by the particular compiler. A comprehensive test package may be developed by the user for each compiler.

The Population File is maintained by the Population File Maintenance Module. Population File test modules are added, deleted or replaced by means of this routine. The Selector Module extracts user-specified test modules from the Population File, distributes the necessary operating system control cards and support statements and generates a self contained JOVIAL source program for subsequent processing. The Source Program Maintenance Module may be used to update a generated JOVIAL source program.

2.3.1 The JCVS Data Base

The Population File contains the following types of information:

- 1. Environmental - Hardware/Software
- 2. Test Modules
- 3. Identification

This information is presented to the Population File on cards whose descriptions are given in Section 4.

2.3.1.1 Environmental - Hardware/Software

Environmental data, both hardware and software, for all computers of interest is carried in the Population File. Hardware specific information such as printer control codes, magnetic tape designations and memory size and software specific information such as operating system control card descriptions and computer-compiler specific JOVIAL control card descriptions offset by one column are carried in the first few records of the Population File.

2.3.1.2 Test Modules

A Test Module is a collection of JOVIAL statements that test a particular feature of the JOVIAL compiler. The feature may be a JOVIAL concept, a single JOVIAL statement or a collection of JOVIAL statements. Included in each Test Module are the:

1. Test identification field
2. Input test data fields
3. Test Results fields
4. Expected Result fields
5. Initialization procedures
6. Test statements comprising the test
7. Results analysis procedures
8. Output procedures

Test Modules are located on the Population File in order of their test serial number, the DDI-NO. With each test statement is associated a sequence number within the DDI-NO that specifies the ordering of the statements within the DDI-NO.

2.3.1.3 Identification

The first 80 characters of the Test Module are devoted to information describing several aspects of the test. These 80 characters, called the Test Module Header, contain the name of the test, its test serial number, any CED AFM 100-24 numbers associated with the test, and any required references to other test modules.

2.3.2 Population File Maintenance Module

This module operates on a Population File and permits the user to add, delete, replace, or change logical records on the Population File. This feature is the means by which the user updates the Population File with current information. Environmental, test, and identification information may be augmented by means of this module.

This module will be used to modify the contents of the Population File to incorporate new tests resulting from extensions to the JOVIAL compiler, to delete current tests when particular aspects of the compiler have not been implemented, or to include information describing the environment in which the JOVIAL tests will be conducted.

2.3.3 The Selector Module

The Selector Module performs the major task of assembling and organizing test and support statements for the JOVIAL test program.

- 1) Using the input specifications obtained from the user, appropriate variants and operand values may be selected.

- 2) The resulting test and support statements are placed in the order needed for compilation.
- 3) Operating system control cards are placed before and after the JOVIAL source test program.

2.3.4 Source Program Maintenance Module

This program is used to modify a JOVIAL source program either generated by the Selector Module or previously modified by the Source Program Maintenance Module. This module may be used if:

- 1) One or more tests did not compile correctly (therefore deletions of erroneous statements or changes to existing statements can be made).
- 2) The user wished to change a test in order to compare with a previous run using different user defined operand values (parametric study).
- 3) The user wishes to add non-standard tests to the JOVIAL source program.

2.3.5 The Test Program

The JOVIAL source program generated by the Selector Module is a self contained JOVIAL J3 program in compilable form. The test structure and content of the particular source program has been completely specified by the user. All statements supporting the test are provided automatically by the JCVS.

Each test within the source program exercises one or more of the features provided by the JOVIAL compiler by actually compiling and executing those JOVIAL statements that provide the feature. The results of this procedure stating the outcome of this execution may be displayed.

It was originally intended to display expected versus actual results. Lack of adequate capabilities of the input/output portions of the JOVIAL language, coupled with an inability to acquire input/output information about the JOVIAL implementations themselves, reduces the comparison printout to a message stating whether the test has passed or failed together with an identification of the associated DDI-NO.

Test results printed under these constraints do not fully reveal the causes of errors in tests devoted to the accuracy of arithmetic operations. The results of syntax-semantic testing, however, are not affected by this constraint.

SECTION III

SYSTEM USAGE

3.1 Hypothetical JCVS Operational Philosophy

DDI hypothesized that the JCVS may be utilized operationally in any of several ways:

1. The entire system, including the Population File, can be distributed to JOVIAL J3 implementors for use in validating their JOVIAL implementation.
2. JOVIAL source programs may be developed by a central agency and the source programs sent to JOVIAL implementors for compilation and execution. Results of these runs could be returned for processing by the same agency.
3. A team of personnel could accompany the JCVS to a specified computer upon which the JOVIAL compiler is to be exercised. The JCVS is then made operational on the computer system and the particular JOVIAL compiler is tested.

Any of the above operational philosophies could be followed, however, based upon the work statement description of the problem, the third philosophy appears to be the most probable approach.

If operational philosophy one or three is followed, all the program modules will be required to execute on the computer for which the JOVIAL compiler has been prepared.

If philosophy two is followed, the Population File Maintenance Module and the Selector Module will be processed on a single computer (possibly not one of the target computers in this contract) while the Source Program Maintenance Module will be processed, at a minimum, on the computer upon which the JOVIAL compiler has been implemented.

For the remainder of this document we shall assume that philosophy three is to be followed and all JCVS modules must be operational on each computer containing the JOVIAL compiler to be tested.

3.2 System Initiation

For each specified computer a Population File and three source decks will be provided. Each of the source decks must be compiled and a resultant binary deck of each program

module obtained. All JCVS program modules will have been written in a subset of COBOL to ensure that the program will, after changes to the input/output characteristics of each program module and appropriate control cards, compile into a useable program.

Once the Population File Maintenance Module has been established on one of the target computers, the Population File may be developed for this computer. Since certain aspects of the JOVIAL language may be specified by the implementor there may be idiosyncracies of the JOVIAL implementation that could necessitate modifications to the JOVIAL test statements or the JOVIAL test statement formats. It is impossible at this time to predict what form these idiosyncracies might take; consequently, the user must be aware of this situation and be capable of adjusting the test statements, if required, to conform to the specific compiler.

A notable example of this problem occurs because the reference format as specified by the AFM 100-24 document indicates that a JOVIAL source program statement may occupy any of the 80 columns on a card. Specific implementors, in general, do not permit this free field interpretation and specify margins within which a JOVIAL statement must be written.

Once the program modules have been compiled and the Population File has been created, the user may proceed to the next step, the generation of a test program.

3.3 Test Program Generation

The selection of tests necessary to validate a JOVIAL compiler may vary widely depending upon the testing philosophy.

More than likely, the particular compiler features to be tested depend entirely on the uses to which the compiler will be exposed and the environment in which the compiler will reside. The JCVS user, presumably knowing this, will have produced specifications to which the compiler must adhere. In order to ensure that the compiler does, indeed, adhere to these specifications, the user selects from the Population File those tests that exercise those features whose correct execution will result in a verification of the stated specifications.

A second approach to the validation of the compiler might consist of selecting for testing all of the features stated as standard by the AFM 100-24 document. Using this approach would give the user a "look see" at what features were implemented.

Having chosen the tests to be processed, the user submits this information to the Selector Module by means of Test Selector Cards. The Selector Module Program deck must be augmented by the operating system control cards for the particular computer upon which the Selector Module is being run.

The exact job deck structure for each computer required to achieve a Selector Module run is given in Appendix 1.

There are occasions when the generated JOVIAL source program will exceed the limitations of either the compiler or the hardware environment. In order to remedy compiler violations, consult the JOVIAL compiler users manual to establish the cause of the trouble.

In order to remedy excessive core storage requirements, segment the generated JOVIAL source program by selecting several smaller programs rather than one large program.

3.4 Test Program Execution

The JOVIAL test program resulting from the Selector Module run is then compiled. If the program compiles with error, these errors should be recorded by the user. By means of the cross referencing mechanism provided with each test, DDI-NO versus CED-NO's, all references to the test may be located in the AFM 100-24 document.

The Source Program Maintenance module may then be used to eliminate from the source program those elements causing the compilation errors. The compilation and element removal process is continued until an error-free compilation has been achieved.

Following a successful compilation, the object program is executed. If the execution terminates abnormally, a study of the partial results obtained by the run will be required to locate the offending test elements. If the execution terminates normally, a glance at the results of the test will provide information signifying individual feature compliance with AFM 100-24 standard.

3.5 Test Result Evaluation

The notion of what constitutes a validated JOVIAL compiler is a function of the requirements to be levied on the compiler. Consequently, the user, based upon the compilation and execution of one or more test programs, must formulate his decision with the information gathered as a result of these test runs.

Within each generated source program there may be tests of two types: Those that test the various syntax-semantics relationships present in the language and those that test the accuracy of arithmetic computations provided by the algebraic expression capabilities of the language.

The syntax-semantics tests are logical in character and can be answered by monitoring the semantic response the compiler provides for a syntactic type.

For example, a reasonable test for the GOTO statement could consist of: Does it go where it says it is going to go? The result is either yes or no. If yes is the case, an

appropriate message is printed out and if not is the case, another message results. As a general rule, the results of logical tests may be indicated by a yes or no decision only.

The tests for accuracy, on the other hand, require that computed results be compared with expected results; that both results, if possible, be converted and printed together with a decision stating that the feature either passed or failed to pass its accuracy requirements.

Accuracy tests, in general, depend upon the ability of the compiler-computer configuration to represent and process correctly numbers exercising the extreme capabilities of the hardware. Given that these operations have been performed correctly (in binary) the problem of converting these numbers to printable form (decimal) requires the application of some JOVIAL output procedures. Since no standard JOVIAL formatting conversion and output procedure exists machine language or other higher level language coding must be utilized in order to view the results. This foreign conversion process, however, can introduce non JOVIAL compiler computational errors into the computed results and render the accuracy considerations of the tests useless.

In the absence of input/output specifications for four of the five JOVIAL compilers in question, only the statement indicating that the feature has passed or failed its test will be printed. When the JOVIAL language provides proper formatting capabilities the ability to display computed and expected results may be added to the output sections of the test modules.

SECTION IV

FUNCTION DESCRIPTION

4.1 Population File Maintenance Module (POPFM)

4.1.1 Purpose and Uses

The POPFM module may be used to generate a new Population File either by initiating the file from cards or by updating an old Population File with current additions to the information contained in the old file. This information consists of Environmental Data or Test Statements. These information types are organized into 4000 character physical records for recording on magnetic tape. Each physical record consists of either a System Module or a Test Module.

The modules are stored in numerically ascending sequence by serial number, the DDI-NO, associated with each of the modules in order to facilitate the processing to be applied to the Population File. This processing permits addition, deletion, or replacement of user specified information to this file.

All physical records are treated identically and the updating functions provided by the JCVS regard only the items (DDI-NO, CARD-TYPE and SEQ-NO) to control the updating process.

Input to the POPFM consists of a current file of information called the Current File-PF, an optionally present old Population File and a control card requesting specific options provided by the module. The Current File-PF is a card file, while the old Population File and the new Population File are magnetic tape files.

Output from this routine consists of an updated Population File, an Audit File-PF consisting of diagnostics, trace messages with an optional listing of all of the card images on the Population File containing information, and an optional Punch File consisting of a card deck of all card images on the new Population File containing information.

4.1.2 Preparation of Inputs

4.1.2.1 System Module

Each computer-compiler configuration will contain environmental data describing specific aspects of the hardware environment in which the JCVS will reside.

Information identifying the hardware configuration, the facility, the user, etc., will be supplied to the Population File by means of System Header cards. Environmental hardware information such as printer codes, magnetic tape designations, etc., will be supplied to the Population File by means of Environmental Hardware cards.

The aforementioned information will be carried as descriptive material only and will not participate in the generation or will not become a part of any of the generated JOVIAL source programs.

On the other hand, the environmental-software information supplied to the Population File by means of Environmental Software cards will become an integral part of the generated JOVIAL program. This software information consists of operating system control cards and the JOVIAL START and TERM cards. Some of these cards precede and others follow the generated program.

4.1.2.1.1 System Header Card 1

System Header Card 1 occupies the first 80 character positions in the System Module (the first 4000 character physical record on the Population File).

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-12	Users Name	These 12 columns may be used to identify the agency or organization using the JCVS. The name may be positioned any place within the field, (Example: bbUSAF-ESDbb, or USAF-ESDbbbb.)
13-24	Facility	These 12 columns may be used to identify the facility at which the JCVS is being utilized. The name may be positioned any place within the field. (Example: bbHANSKOMbbb, or bHANSKOM AFB.)
25-34	Computer-Name	These 10 columns may be used to identify the computer manufacturer and machine serial number. The name may be positioned any place within the field. (Example: bCDC-6600b, or GE-635 bbbb.)

<u>Columns</u>	<u>Name</u>	<u>Description</u>
35-45	Data of Basic File Creation	These 11 columns may be used to identify the date on which the basic form of the Population File has been created. The month, day, and year are specified YYYYbMM MbDD. (Example: MAYb12b1968, or SEPb13b1967).
46-47	Modification Number	These 2 columns may be used to identify the number of times that the basic file has been modified. (Example: Second modification 02, tenth modification 10).
48-58	Date of Creation of this File	These 11 columns may be used to identify the date that this file was created. The month, day, and year are specified YYYYbMMM bDD. (Example: DECb17b1968, or MAYb25b1968).
59-72 73-76	Not Used DDI-NO	These 14 columns are not used. These 4 columns contain the test serial number, the DDI-NO, 0001.
77	Card Type	This column contains the character A that indicates that this card is a non-test statement card.
78-80	Sequence Number	These 3 columns contain 001 indicating that this card occupies the first 80 columns in the System Module.

4.1.2.1.2 System Header Card 2

System Header Card 2 occupies the second set of 80 character positions in the System Module and contains the following information:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-35	Validation System Name	These 35 columns may be used to identify the particular modification of the validation system. (Example: bbbbbbJCVSbMAYb1968bbbbbb, or JOVIALbCOMPILERbVALIDATIONbSYSTEMb5).

<u>Columns</u>	<u>Name</u>	<u>Description</u>
36-72	Operating System Name	These 37 columns are used to identify the operating system within which the JCVS is imbedded. (Example: bbbblBM-360bDISKb OPERATINGbSYSTEMbbbb).
73-76	DDI-NO	These 4 columns contain the test serial number, the DDI-NO, 0001.
77	Card Type	This column contains the character A that indicates this card is a non-test statement card.
78-80	Sequence Number	These 3 columns contain 002 indicating that this card occupies the second 80 columns in the System Module.

See Appendix 2 for complete description of all of the System Header Card 2 card types used on the five computer-compiler configurations.

4.1.2.1.3 Environmental Hardware Card 1

Environmental Hardware Card 1 occupies the third set of 80 character positions in the System Module and contains the following information:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-30	System Input	These 30 columns contain the acceptable hardware name for the system input unit.
31-60	System Output	These 30 columns contain the acceptable hardware name for the system output unit.
61	Space Code	This column contains the printer single space code.
62	Double Space Code	This column contains the printer double space code.
63	Page Eject	This column contains the printer page eject code.
64-70	Memory Size	These 7 columns contain the core memory size.
71-72	Not Used	These 2 columns are not used.
73-76	DDI-NO	These 4 columns contain a DDI-NO = 0001.

<u>Columns</u>	<u>Name</u>	<u>Description</u>
77	Card Type	This column contains the character A that indicates this card is a non-test statement card.
78-80	Sequence Number	These 3 columns contain a sequence number = 003.

4.1.2.1.4 Environmental Hardware Card 2

This card occupies the fourth set of 80 character positions in the System Module and contains the following information:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-30	System Punch	These 30 columns contain the acceptable hardware name for the system punch unit.
31-60	Scratch 1	These 30 columns contain the acceptable name for a scratch unit 1.
61-72	Not Used	
73-76	DDI-NO	These 4 columns contain a DDI-NO = 0001.
77	Card Type	This column contains the character A that indicates that this card is a non-test statement card.
78-80	Sequence Number	These 3 columns contain a sequence number = 004.

4.1.2.1.5 Environmental Hardware Card 3

This card occupies the fifth set of 80 characters in the System Module and contains the following information:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-30	Scratch 2	These 30 columns contain the acceptable hardware name for tape scratch unit 2.
31-60	Scratch 3	These 30 columns contain the acceptable hardware name for tape scratch unit 3.
61-72	Not Used	

<u>Columns</u>	<u>Name</u>	<u>Description</u>
73-76	DDI-NO	These 4 columns contain the DDI-NO = 0001.
77	Card Type	This column contains the character A that indicates this card is a non-test statement card.
78-80	Sequence Number	These 3 columns contain a sequence number = 005.

See Appendix 3 for a complete description of the Environmental Hardware Cards for the five computer configurations.

4.1.2.1.6 Environmental Software Cards

These cards provide specific operating system control cards that may be used to specify the functions to be performed by the operating system and the JOVIAL START and TERM cards that bracket the JOVIAL source program. These cards have SEQ-NO's greater than 005 and are stored in the System Module shifted right one column.

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1	Not Used	
2-72	Environmental Software Statement	These 71 columns provided contain a request of the operating system to perform a specific task.
73-76	DDI-NO	These 4 columns contain the test serial number, the DDI-NO, 0001.
77	Card Type	This column contains either the character L that indicates this card precedes the JOVIAL source program or the character F that indicates this card follows the JOVIAL source program.
78-80	Sequence Number	These 3 columns may contain the digits 005 through 050 which serves to indicate the relative position of this card in the System Module.

A current list of the Environmental Software cards excepting the JOVIAL START and TERM cards (GE-635 only) used by the JCVS is given for each computer configuration in Appendix 4.

4.1.2.2 Test Modules

A test module is a collection of JOVIAL statements that test a particular feature of the JOVIAL compiler. The feature to be tested may be a JOVIAL concept, a single JOVIAL

statement or a collection of JOVIAL statements. Included in each test module are the:

1. Test identification field
2. Input test data fields
3. Test result fields
4. Expected result fields
5. Initialization procedures
6. Test statements comprising the test
7. Results analysis procedures
8. Output formatting procedures

The tests are carried in the Population File in order of ascending DDI-NO. Within each DDI-NO the test header and the JOVIAL test statement cards are carried in order by ascending Sequence Number. The DDI-NO identifies each test module to all of the JCVS program modules and the user. Population File test modules may be assigned a four digit DDI-NO between 0500 and 9997.

Each Test Module begins with a Test Header Card that contains the DDI-NO, the Sequence Number, the test name, one or more references to the associated paragraphs in the AFM 100-24, and, if required, a number called the Mandatory DDI-NO of a module called the Mandatory Module upon which the current module depends. Additional JOVIAL comment cards may be included anywhere in the Test Module. See Appendix 5 for samples of these cards in the Typical Test Module.

The Mandatory Module could contain data or support statements required by the dependent module and, hence, must be present in any JOVIAL source program including the dependent module; or the Mandatory Module could contain another feature test whose validity must be established before a successful execution of the dependent module feature test may be considered valid. See Appendix 5 for some typical Population File modules.

4.1.2.2.1 Test Header Card

The Test Header Card occupies the first 80 characters in a JOVIAL Test Module record in the Population File and contains information about the test statements that follow.

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-2	Open Quotes	These 2 columns contain quote marks.
3-22	Test Name	These 20 columns describe what feature the JOVIAL statements test. (Example: THREEbFACTORbFOR bbbb, or GOTObSTATEMENTbbbbbb).

<u>Columns</u>	<u>Name</u>	<u>Description</u>
23-27	CED-NO1	These 5 columns identify a reference in the AFM 100-24 to the feature being tested.
28 29-33	Not Used CED-NO2	These 5 columns identify a reference in the AFM 100-24 to the feature being tested.
34 35-39	Not Used CED-NO3	These 5 columns identify a reference in the AFM 100-24 to the feature being tested.
40 41-45	Not Used CED-NO4	These 5 columns identify a reference in the AFM 100-24 to the feature being tested.
46 47-51	Not Used CED-NO5	These 5 columns identify a reference in the AFM 100-24 to the feature being tested.
52 53-57	Not Used CED-NO6	These 5 columns identify a reference in the AFM 100-24 to the feature being tested.
58 59-62	Not Used Mandatory DDI-NO	These 4 columns identify the DDI-NO of a Mandatory Module upon which the current test module depends.
63-64	Close Quotes	These 2 columns contain quote marks.
65-72 73-76	Not Used DDI-NO	These 4 columns contain the test serial number, the DDI-NO. (Example: 4500, 7500, 1410).
77	Card Type	This column contains either the character A or B or C that indicates this card is a non-test statement card.
78-80	Sequence Number	These 3 columns contain 001, indicating that this card occupies the first 80 columns of the Test Module on the Population File.

4.1.2.2.2 JOVIAL Statement Card

The JOVIAL Statement Card contains one or more JOVIAL statements to be used in a generated JOVIAL source program. Only the first seventy-two card columns may be used for the statement. Columns 73-80 will be used for card identification.

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-72	JOVIAL Statements	These 72 columns may contain one or more JOVIAL statements.
73-76	DDI-NO	These 4 columns contain the test serial number, the DDI-NO. (Example: 2100, 4500, 7600).
77	Card Type	This column contains the character J that indicates this card is a test statement card.
78-80	Sequence Number	These three columns contain a number, 002-050, specifying the position of the JOVIAL Test Statement Card within the Test Module. (Example: 015 indicates that this card occupied the 15th 80 column position in the Test Module.)

4.1.2.3 Packet Cards

4.1.2.3.1 Control Card - PF

The various options permitted by the Population File Maintenance Module may be requested by means of the following control card:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1	Control Card Indicator	This column must contain the character C denoting the card as a control card.
2-4	Control Card Identifier	These 3 columns may be assigned any 3 digits by the user to identify the control card.
5	Mode Designator	This column is used to signify the run type C = CREATE run U = UPDATE run

<u>Columns</u>	<u>Name</u>	<u>Description</u>
6	Print Option	This column may be used to request the printing of the new Population File on the Audit File-PF non-space - Print space - Do not print
7	Punch Option	This column may be used to request the punching of the new Population File. non-space - Punch space - Do not punch
8-80	Not Used	

When submitting this card to the Population File Maintenance Module the Control Card - PF directly precedes the card deck comprising the Current File - PF.

4.1.2.3.2 Delete Card

The Delete card is used to signal the Population File Maintenance Module to eliminate a record or a specific card from the Population File.

The form of the Delete card follows:

<u>Columns</u>	<u>Field Size</u>	<u>Description</u>
1-72	72	Not Used
73-76	4	DDI-NO
77	1	Update Function = D
78-80	3	Sequence Number

When this card is used to delete a module from the Population File, it must be included in the Current File - PF with the DDI-NO equal to the DDI-NO of the record to be eliminated from the Population File and the Sequence Number equal to 000. When this card is used to delete a card image from a record in the Population File it must be included in the Current File - PF with the Sequence Number and DDI-NO equal to the corresponding Sequence Number and DDI-NO of the card image to be eliminated from the Population File.

4.1.2.4 Input Files

The Population File Maintenance Module operates upon two input files, an optionally present Population File and the Current File - PF.

4.1.2.4.1 Population File

The Population File is organized into equal size logical records. Each logical record is composed of 4000 characters and consequently can accomodate fifty 80-column cards. Each logical record is recorded on one physical record.

The first few records on the Population File are System Modules and each contains all of the environmental and indicative information pertinent to various hardware configuration operating systems and JOVIAL compilers. A System Module may be assigned any DDI-NO between 0001 and 0499.

The remainder of the records (excepting modules 9998 and 9999) contain the individual test modules. The first eighty characters of the module are called the Test Module Header and contain information pertinent to the specific test module. Column 77 of the Test Module Header contains either the characters A, B, or C. The character B present in a Test Module Header indicates the module is an extension of the previous module and the two physical test modules act as a collection of physical modules. The character A or C present in a Test Module Header indicates the module is the beginning of a new physical module or a collection of physical modules. The character C present in a Test Module Header indicates the physical module or collection of physical modules is a mandatory module that must be present in every generated source program. Figure 4-1 gives a physical layout of the Population File.

4.1.2.4.2 Current File-PF

The Current File-PF, which directs the Population File Maintenance Module to update the Population File consists of card packets containing environmental, test, indicative or functional information. Environmental information (e.g., hardware configuration descriptions, operating system control cards, etc.) is presented by means of the Environmental Packets, test information (e.g., JOVIAL test statements) by means of the Test Packets and functional information (the Population File Maintenance Module update command, delete) by the Delete Packets. Indicative information (e.g., DDI-NO, Sequence Number, etc.) is included where required in all packets. A test serial number, the DDI-NO, is assigned to each packet and each card within the packet contains this number in columns 73-76. In addition, ordering the cards within each packet is controlled by the Sequence Number in columns 78-80. The Environmental Packet consists of the following cards in the order specified:

	<u>Number of Cards</u>
1) System Header Card 1	1
2) System Header Card 2	1
3) Environmental Hardware Cards	3
4) Environmental Software Cards	M

The total number of Current File-PF cards in one packet acceptable to the Population File cannot exceed 50; consequently, M, the number of Environmental Software Cards, must be less than or equal 45.

4000 characters
50 cards

SYSTEM HEADER 1
DDI-NO = 0001 SEQ-NO = 001
SYSTEM HEADER 2
DDI-NO = 0002 SEQ-NO = 002
ENVIRONMENTAL HARDWARE
DDI-NO = 0100 SEQ-NO = 001
ENVIRONMENT SOFTWARE - LEAD
DDI-NO = 0200 CARD TYPE = 1 SEQ-NO = 001
ENVIRONMENT SOFTWARE - FOLLOW
DDI-NO = 0300 CARD TYPE = 1 SEQ-NO = 001

80 characters/card

80 characters/card

80 characters/card

80 characters/card

80 characters/card

FILLER
REQUIRED

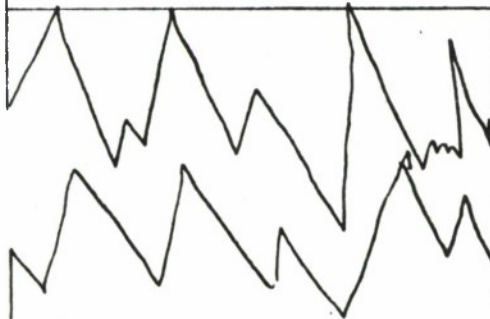
TEST HEADER 1 MODULE 1

80 characters/card

MODULE 1
JOVIAL
TEST
STATEMENTS

TEST MODULE 1
3920 characters

4000 characters
50 cards



TEST HEADER 1 MODULE N

MODULE N
JOVIAL
TEST
STATEMENTS

TEST MODULE N
3920 characters

4000 characters
50 cards

Figure 4-1: Population File

The Test Packet consists of the following cards:

	<u>Number of Cards</u>
1) Test Header Card	1
2) JOVIAL Statement Cards	N_1
3) DELETE Cards	N_2

The total number of cards in one packet acceptable to the Population File cannot exceed 50; consequently, $N_1 + N_2$, the number of JOVIAL Statement Cards plus DELETE cards may not exceed 49.

The DELETE Packet consists of one card, the DELETE Card.

The Current File - PF consists of a collection of the above mentioned packets in order of Sequence Number within DDI-NO. Only those cards that are to effect elements in the old Population File need to be included in the Current File - PF.

4.1.3 Function Operation

The Population File Maintenance Module operates either to initiate a Population File completely from the Current File-PF or to update an existing Population File by means of information residing on the Current File - PF. In each case, the control card permits the user to specify options to print and/or to punch the resulting new Population File.

4.1.3.1 Create Population File

When the Population File Maintenance Module is used to initiate a Population File the Current File - PF may contain only information to be added to the file. Consequently, no DELETE cards are permitted in the Test Packets that comprise the Current File-PF.

The packets are placed in order by DDI-NO to form the Current File - PF. The Mode Designator in the control card is set to C and the appropriate print/punch options are selected. The control card precedes the Current File - PF when submitted to the Population File Maintenance Module.

Since no old Population File is required for this run, all the test modules in the Current File - PF utilize the update function ADD and are ADDED to form the Population File.

4.1.3.2 Update Population File

When the Population File Maintenance Module is used to update an existing Population File, DELETE cards may be present in the packets comprising Current File-PF. Each Current File - PF packet is composed of a collection of cards, each card invoking an update function which performs one of the following operations:

- 1) Add a card to a new or an existing test module
- 2) Replace a card on an existing test module
- 3) Delete one or more existing test modules
- 4) Delete a card from an existing test module

The update functions are controlled on the basis of two items included in every card in the Population File:

- 1) DDI-NO (columns 73-76)
- 2) Sequence Number (columns 78-80)

The packets in the Current File-PF may contain no more than 50 cards and must be in order within the packet by Sequence Number within DDI-NO. The Sequence Numbers, however, need not be consecutive.

In order to reduce the card preparation requirements of the system, the ADD feature and REPLACE feature are invoked automatically. Specifically the update functions adhere to the following rules:

1. ADD

If an ADD (a card to be ADDED to the Population File) card is included in a packet on the Current File-PF and no card with the same DDI-NO (columns 73-76) and Sequence Number (columns 78-80) is present in the old Population File, the card in the Current File-PF is automatically added to the Population File in its proper sequence.

2. REPLACE

If a REPLACE card (a card intended to REPLACE another card on the Population File) is included in a packet on the Current File-PF and a card with the same DDI-NO (columns 73-76) and Sequence Number (columns 78-80) is present in the old Population File, the card in the Current File-PF automatically replaces the corresponding card on the new Population File.

3. DELETE

The DELETE option is invoked by means of a DELETE packet included in the Current File-PF. This packet may instruct that either an entire record or a card within a record not be recorded on the new Population File. If the Sequence Number on the DELETE packet is 000 and the DDI-NO matches a DDI-NO in the old Population File the entire record and any succeeding records with B in **column 77** of the Test Module Header are not recorded on the new Population File.

If the Sequence Number on the DELETE packet is a number between 001 and 050 **and the** DDI-NO and Sequence Number match a DDI-NO and Sequence Number

in the old Population File, the matched card is not recorded on the new Population File. If a match is not effected, a diagnostic is printed.

Consequently, a packet in the Current File - PF may contain ADD, REPLACE, and DELETE functions applicable to a specific record on the old Population File. When card images on the old Population File are to be altered, only the cards that are to provide the changes need be included in the Current File - PF packets.

On the other hand, an entire record may be deleted by the inclusion in the Current File - PF of the appropriate DELETE packet.

The Population File Maintenance Module only changes those card images on records in the existing Population File that have been specified by the user.

The packets are placed in order by Sequence Number within DDI-NO to form the Current File - PF. The Mode Designator in the control card is set to U and the appropriate print/punch options are selected. The control card precedes the Current File - PF when submitted to the Population File Maintenance Module.

4.1.4 Description of Expected Results

4.1.4.1 Output Card Formats

The output card formats correspond to the formats for cards as described in Section 4.1.2.

4.1.4.2 Output Files

The Population File Maintenance Module produces three output files, the Population File, the Audit File - PF, and the Punch File - PF.

4.1.4.2.1 Population File

The results of either a CREATE or an UPDATE run will always produce a new Population File which is completely described in Section 4.1.2.

4.1.4.2.2 Audit File - PF

The Audit File - PF contains a listing of all diagnostics and trace messages originating from this module. As an optional feature, the user may request to print on the Audit File - PF a working listing of the card images on the new Population File by selecting the print option on the Control Card - PF. Since the Audit File - PF is only a working listing, diagnostic and

tracing information will be interspersed with the Population File card images on the Audit File - PF.

Following is a list of the diagnostic messages to be printed in the Audit File-PF together with their explanations:

<u>Diagnostic Message</u>	<u>Explanation</u>
NO UPDATE FUNCTION CARD	There is no control card preceding the Current File-PF.
RECORD TO BE DELETED NOT ON OLD MASTER FILE	The Current File-PF contains a DELETE packet referencing a DDI-NO not on the old Population File.
CURRENT FILE CARDS ARE OUT OF SEQUENCE	The cards in the Current File-PF are not in sequence by DDI-NO.
INITIAL RUN CARD NOT PRESENT	The control card preceding the Current File-PF contains an incorrect Mode Designator.
OVERFLOW MASTER RECORD BUFFER	The Current File-PF contains a card whose sequence number is greater than 50.

Following is a list of the trace messages to be printed on the Audit File-PF.

The following messages are all paragraph names printed from within each named paragraph:

- 1) IUC
- 2) UPDATE CONTROL
- 3) OLD MASTER FILE READOUT
- 4) END OF CURRENT FILE
- 5) END OF OLD MASTER FILE
- 6) END OF OLD MASTER FILE 4

The following typical trace message is printed whenever the WRITE-ERROR paragraph is entered:

LAST CARD KEY	0002A005
LAST CURRENT FILE KEY	0002A003
LAST OLD MASTER FILE KEY	0005A004

The information opposite the LAST CARD KEY represents the control field (columns 73-80) of the last Current File-PF card read.

The information opposite the LAST CURRENT FILE KEY represents the control field of the next to last Current File-PF card read.

The information opposite LAST OLD MASTER FILE KEY represents the control field of the first card image in the last physical record read from the old Population File.

This trace information is printed on one line in the Audit File-PF.

4.1.4.2.3 Punch File - PF

Yet another option, the punch option, may be selected by the user to obtain a card deck of all card images on the Population File containing information.

4.2 Selector Module (SJCVS)

4.2.1 Purposes and Uses

The Selector Module performs the major task of assembling and organizing test and support structures for the JOVIAL test program.

1. Using the input specifications obtained from the user, appropriate test and support structures may be selected.
2. The resulting test and support structures are placed in the order needed for compilation.
3. Environmental Software cards are placed before and after the JOVIAL source test program.

Input to the Selector Module consists of the Population File, the Test Selection File, (a collection of user specified cards which control the identity of the tests selected from the Population File) and a control card requesting the specific options provided by the module.

Output of the Selector Module includes a Source Program File consisting of the generated JOVIAL Source program, the Audit File-S consisting of a diagnostics, trace message with an optional listing of the Source Program File and an optional Punch File-S consisting of a card deck of the Source Program File.

4.2.2 Preparation of Inputs

4.2.2.1 Input Card Formats

Following is a description of the card types and formats input to the Selector Module.

4.2.2.1.1 Test Selector Card

The Test Selector Card permits the user to specify the selection of one or more test modules from the Population File. The user specifies the DDI-NO identifying the first test module to be selected, the increment to be added to the DDI-NO identifying the first test module, and the DDI-NO identifying the last test module to be selected. If only one test module is to be selected at a time, the increment may be set to 0000 or left blank. The following describes the format of the Test Selector Card:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-4	Control Word	These 4 columns must contain the control word TEST.
5-10 11-14	Not Used Starting DDI-NO	These 4 columns contain the DDI-NO identifying the first Population File Test Module to be selected by this Test Selector Card.
15-20 21-24	Not Used Increment	These 4 columns contain the value to be added to the starting DDI-NO and succeeding DDI-NO's until the final DDI-NO has been selected.
25-30 31-34	Not Used Final DDI-NO	These 4 columns contain the DDI-NO identifying the last Population File Test Module to be selected by this Test Selector card.
35-80	Not Used	

4.2.2.1.2 Control Card-S

The various options permitted by the **Selector** Module may be requested by means of the following control card:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1	Control Card Indicator	This column must contain the character C denoting the card as a control card.

<u>Columns</u>	<u>Name</u>	<u>Description</u>
2-4	Control Card Identifier	These 3 columns may be assigned any 3 digits by the user to identify the control card.
5-6	Margin A	These 2 columns are used to designate the column number of Margin A on the Source Program File card images.
7-8	Margin B	These 2 columns are used to designate the column number of Margin B on the Source Program File card images.
9	Print Option	This column may be used to request the printing of the Source Program File on the Audit File-PF. non-space - Print space - Do not print
10	Punch Option	This column may be used to request the punching of the Source Program File. non-space - Punch space - Do not punch
11-14	System Module DDI-NO	The DDI-NO of the appropriate System Module to be selected from the Population File.
15-80	Not Used	

4.2.2.2 Input Files

The Selector Module operates upon two input files: the Population File and the Test Selection File.

4.2.2.2.1 Population File

The Population File has been thoroughly described in Section 4.1.2.

4.2.2.2.2 Test Selection File

The Test Selection File consists of a collection of Test Selector cards that direct the generation of a JOVIAL source program. One or more tests may be selected by means of a Test Selector card. The collection of Test Selector cards may be submitted to the Selector Module in any order.

4.2.3 Function Operation

The Selector Module, under the direction of the Test Selection File, operates on the Population File to produce a single JOVIAL source program consisting of 80 column card images from one or more JOVIAL test modules residing on the Population File.

The Test Selection File controls the identity of the Population File test modules that are recorded on the Source Program File. For example, suppose the Test Selection File consisted of the following Test Selector card information with no Mandatory DDI-NO's involved.

<u>Card Number</u>	<u>Starting DDI-NO</u>	<u>Increment</u>	<u>Final DDI-NO</u>
1	4100	0010	4200
2	3000	0005	3010
3	6000	0000	
4	8100	0001	8105

The Source Program File would consist of the following sequence of selected test modules as identified by their associated DDI-NO's:

3000, 3005, 3010, 4100, 4110, 4120, 4130, 4140, 4150, 4160, 4170,
4180, 4190, 4200, 6000, 8100, 8101, 8102, 8103, 8104, 8105

Notice that the test modules selected as indicated by the list of DDI-NO's are not in the same order as they appear on the Test Selection File, but are in ascending order by DDI-NO, the same order that they appear on the Population File. All mandatory and environmental software cards supporting the generated test, and modules 9998 and 9999, are automatically selected or generated by the Selector Module.

In the following example, suppose the Test Selection File consisted of the following Test Selector Card information:

<u>Card Number</u>	<u>Starting DDI-NO</u>	<u>Increment</u>	<u>Final DDI-NO</u>
1	4100	0010	4120
2	3000	0005	3010
3	6000	0000	

Suppose further that the Mandatory DDI-NO's associated with each of the above DDI-NO's are given in the following list:

<u>DDI-NO</u>	<u>Mandatory DDI-NO</u>
4100	2500
4110	----
4120	1200
3000	2215
3005	2210
3010	2210
6000	4000

Suppose also that the Test Module headers for modules 2000 and 8000 have C's in column 77 and that the Test Module headers for modules 2216, 4101, 4102, and 8001 have B's in column 77. Assuming this, when the Test Selection File is submitted to the Selector Module, the following test modules will be selected and placed on the Source Program File in the following order:

<u>Test Module</u>	<u>DDI-NO</u>	<u>Test Module</u>	<u>DDI-NO</u>
1	1200	10	4000
2	2000	11	4100
3	2210	12	4101
4	2215	13	4102
5	2216	14	4110
6	2500	15	4120
7	3000	16	6000
8	3005	17	8000
9	3010	18	8001

Mandatory test modules will be supplied only once in the output of the Selector Module. Notice that again the test modules are placed on the Source Program File in order of ascending DDI-NO. In addition the mandatory modules supporting the generated test, modules 0001, 9998 and 9999 are selected or generated by the Selector Module. All modules with a C in column 77 are automatically selected by the Selector Module. Modules with a B in column 77 should not be selected by the user.

4.2.4 Description of Expected Results

4.2.4.1 Output Card Formats

Following is a description of the card types and formats output by the Selector Module.

4.2.4.1.1 Environmental Software Card

These cards provide communication between the generated JOVIAL source program and the operating system of the particular computer. These cards both precede and follow the JOVIAL source program and are operating system specific. For a description of the operating system cards for the five computers used by the JCVS see Appendix 4. For a complete description of this card see Section 4.1.2.1.6.

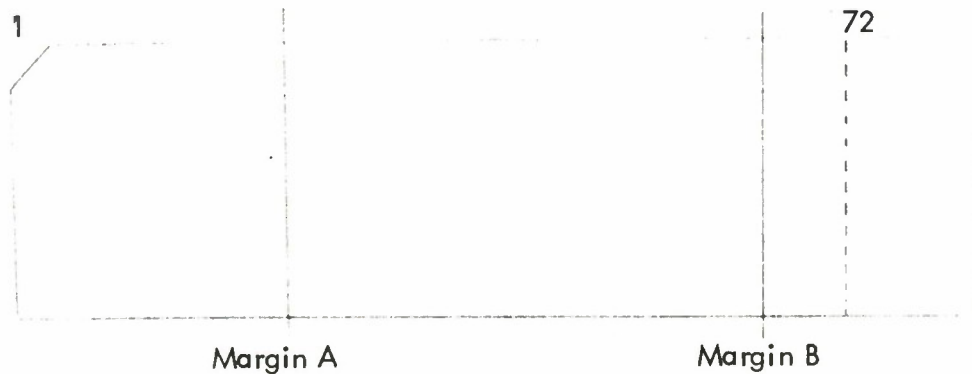
4.2.4.1.2 Test Header Card

These cards are placed in the JOVIAL source program as comment cards. They serve to identify the test and provide cross referencing information between the DDI-NO and associated AFM 100-24 references, the CED-NO's. A complete description of this card is given in Section 4.1.2.2.1.

4.2.4.1.3 JOVIAL Source Program Card

The JOVIAL Source Program Card contains one or more JOVIAL statements to be used in a generated JOVIAL source program. As with most cards associated with the JCVS columns 73-80 will be used for card identification.

Columns 1-72, however, will be subdivided into a maximum of three sections as indicated in the diagram.



Margins A and B specify card columns selected by the user between which is contained as much of the content of a JOVIAL Statement Card as permitted by the margin specifications. Card column 1 from the JOVIAL Statement Card is transferred to the card column specified by Margin A in the JOVIAL Source Program Card; Column 2 is transferred to column Margin A+1, etc. If column k is transferred to Margin B, columns k+1 through 72 of the JOVIAL Statement Card are not transferred and, hence, lost. These margin specification features are provided to the user because of the lack of standardization of JOVIAL J3 reference formats.

The two margins must adhere to the following inequality:

$$\text{column 1} \leq \text{Margin A} < \text{Margin B} \leq \text{column 72}$$

If no Margins are specified, Margin A will nominally be set to 1 and Margin B to 72. Notice that the character string signifying the JOVIAL statement must be short enough to fit between the margin. Specifically the character string must adhere to the following inequality:

$$\text{Length of character string} \leq \text{Margin B} - \text{Margin A} + 1$$

The form of the JOVIAL Source Program Card follows.

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1-Margin A Margin A - Margin B	Not Used JOVIAL Statement	These (Margin B - Margin A) columns contain one or more JOVIAL statements.
Margin B-72 73-76	Not Used DDI-NO	These 4 columns contain either the DDI-NO (e.g., 2100, 4500, 7610) or the number 9999.
77	Card Type	This column contains the character J that indicates this card is a test statement card.
78-80	Sequence Number	These 3 columns contain a number, 002-051 specifying the position of the JOVIAL Source Program Card within the card images from the selected Test Module.

4.2.4.2 Output Files

The Selector Module produces three output files: The Source Program File, the Audit File-S, and a Punch File-S.

4.2.4.2.1 Source Program File

The Source Program File contains the JOVIAL source program. The generated source program consists of, in part, JOVIAL statement card images from Test Modules in the Population File. Preceding and following the source program are operating system cards that form the linkage between the JOVIAL source program and the operating system. In addition, every test present in the Source Program File may be identified by the Test Header card preceding the JOVIAL test statements comprising the test.

The Source Program File is recorded one output card image per physical record. Since the Source Program File is in the same order as the Population File, by Sequence Number within DDI-NO, the DDI-NO and Sequence Number act as the control items for this file.

Since the environmental software cards that follow the generated JOVIAL source program originate from the System Module; these cards would normally have a DDI-NO equal to 0001 in the Source Program File. As a result, these cards would be out of order in a generated JOVIAL source program. In order to alleviate this situation, all trailing environmental software cards are automatically assigned a DDI-NO = 9999. Sequence numbers in these cards, however, remain unchanged.

The START card will contain the DDI-NO of the selected System Module and the same Sequence Number it possessed in the System Module. The TERM card is assigned the DDI-NO = 9999 but contains the same Sequence Number it possessed in the System Module.

Figure 4-2 gives a physical layout of the Source Program File.

4.2.4.2.2 Audit File-S

The Audit File-S contains a listing of all diagnostics and trace messages emanating from this module. As an optional feature, the user may request to print on the Audit File-S, a working listing of the card images on the new Source Program File by selecting the print option on the Selector control card. Since the Audit File-S is only a working listing, diagnostic and tracing information will be interspersed with Source Program File card images on this file.

Following is a list of the diagnostic messages to be printed on the Audit File.

<u>Diagnostic</u>	<u>Explanation</u>
EXCEEDED DDI-NO TABLE	There exists on the Population File a DDI-NO greater than 9998. Check the Population File for cause of error.
DDI-NO AND INDEX NOT SYNCHRONIZED	In processing the Population File the DDI-NO on the current Population File record is less than the DDI-TABLE index. Probable cause: Machine malfunction.
UNEXPECTED EOF INFILE	An unexpected end of file has been triggered on INFILE. Check the Control Card-S and the Test Selection File for cards that could cause the end of file and restart the program.
UNEXPECTED EOF POP-FILE	An unexpected end of file has been encountered on the Population File. Check to see if the Population File has been rewound properly and restart program. This diagnostic is probably triggered by a machine error.
NO CONTROL CARD	There is no Control Card-S or an incorrect Control Card-S present in the INFILE. Supply the correct Control Card-S and restart.

LOCKING FACTOR

ONE CARD PER
PHYSICAL RECORD

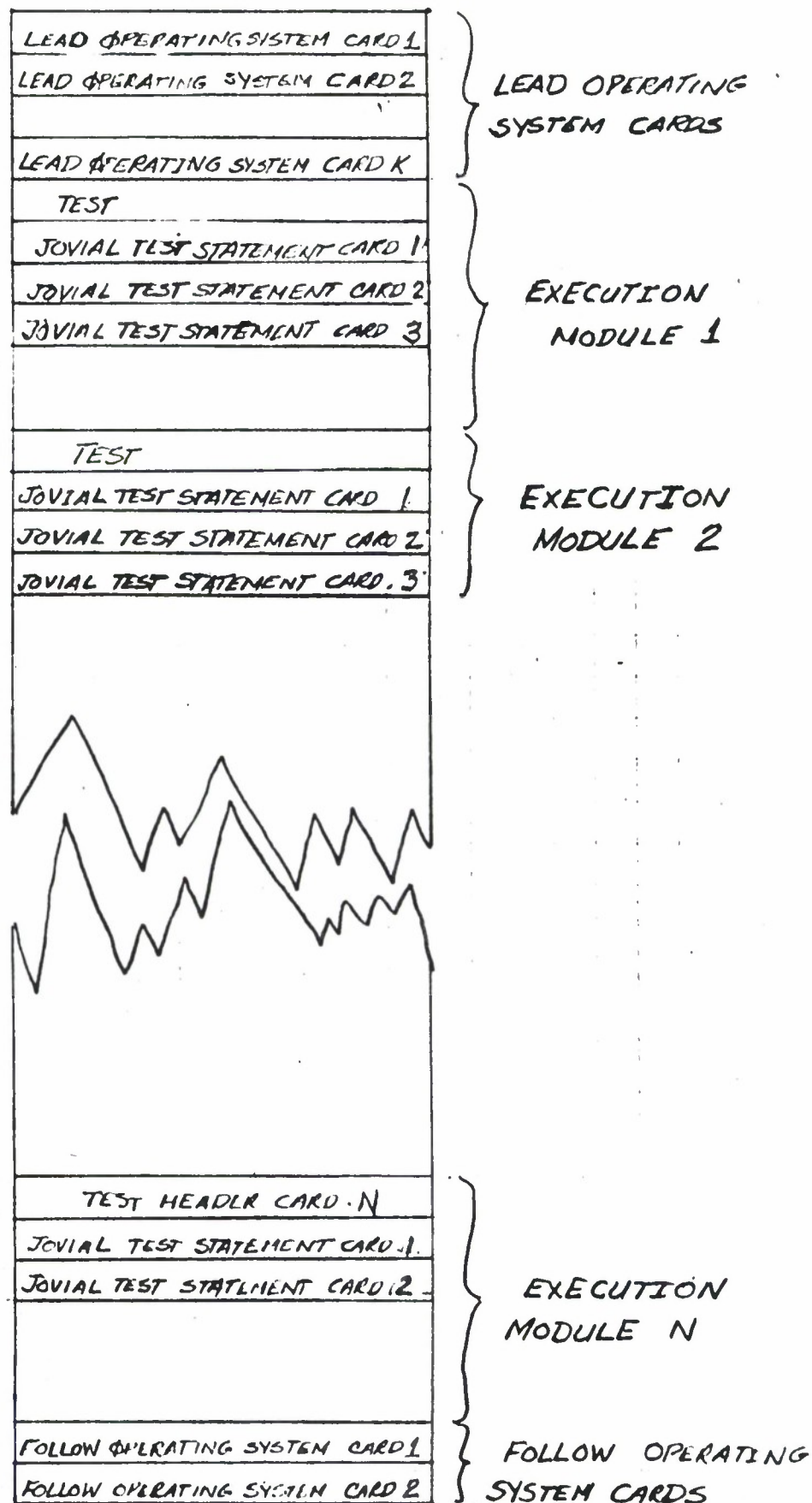


Figure 4-2. Source Program File

<u>Diagnostic</u>	<u>Explanation</u>
INCORRECT TEST SELECTOR CARD	There is an incorrect Test Selector Card in the INFILE. Correct the card and restart the program.
INCORRECT CONTROL CARD	The Control Card-S margin specifications are incorrect. Correct specifications and restart program.

Following is a list of trace messages to be printed on the Audit File-S.

The following trace messages are all paragraph names printed from within the named paragraphs:

1. BDT1
2. BUILD-SPF

The following trace messages are values that monitor the contents of key items together with the paragraph names printed from within the named paragraphs.

<u>Message</u>	<u>Originating Paragraph</u>
1. Contents of item DDI-NUMBER	BDT2
2. BMT1, Contents of item DUMP	BMT1
3. Contents of record CARD	ERR-PROC-6

4.2.4.2.3 Punch File-S

Yet another option, the punch option, may be selected by the user to obtain a card deck of all card images on the Source Program File.

4.3 Source Program Maintenance Module (SOPMM)

The Source Program Maintenance Module is used to modify either the JOVIAL source program generated by the Selector Module or a JOVIAL source program previously modified by SOPMM. Modifications may be necessary because:

- 1) One or more tests did not compile correctly; therefore, deletions of erroneous statements or changes to existing statements can be made.
- 2) The user wishes to change a test in order to compare with a previous run.
- 3) The user may wish to add self contained non standard tests.
- 4) Certain areas of the JOVIAL compiler have not been debugged completely.
- 5) The user may wish to eliminate partially implemented features.

Input to the Source Program Maintenance Module consists of a Source Program File, the Current File-SP, and a control card requesting specific options provided by this module.

Output from the Source Program Maintenance Module includes an updated Source Program File consisting of the modified JOVIAL source program, the Audit File-SP consisting of diagnostics, trace messages with an optional listing of the Source Program File and an optional Punch File-SP consisting of a card deck of the updated Source Program File.

4.3.1 Preparation of Inputs

4.3.1.1 Card Inputs

4.3.1.1.1 Control Card-SP

The various options permitted by the Source Program Maintenance Module may be requested by means of the following control card:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1	Control Card Indicator	This column must contain the character C denoting the card as a control card.
2-4	Control Card Identifier	These 3 columns may be assigned any 3 digits by the user to identify the control card.
5	Mode Designator	This column is only referenced descriptively and does not influence the run type which is always an UPDATE run. It should be set to U for documentary purposes.
6	Print Option	This column may be used to request the printing of the new Source Program File non-space - Print space - Do not print
7	Punch Option	This column may be used to request the punching of the new Source Program File. non-space - Punch space - Do not punch

<u>Columns</u>	<u>Name</u>	<u>Description</u>
8	Trace Option	This column may be used to request printing on the Audit File-SP of all the trace messages originating in this module. non-space - Print messages space - Do not print messages
9-80	Not Used	

When submitting this card to the Source Program Maintenance Module the Control Card-SP directly precedes the card deck comprising the Current File-SP.

4.3.1.1.2 Other Card Inputs

A complete description of all other card forms contained in either the Source Program File or the Current File-SP is given in Sections 4.1.2.3.2 and 4.2.4.

4.3.1.2 Input Files

4.3.1.2.1 Source Program File

The Source Program File has been completely described in Section 4.2.4.2.1.

4.3.1.2.2 Current File-SP

The Current File-SP which directs the Source Program Maintenance Program to update the Source Program File is composed of individual cards that provide the capability to add, delete, and replace information on the Source Program File.

The following card types may appear in the Current File-SP:

1. Environmental Software Card
2. Test Header Card
3. JOVIAL Source Program Card
4. DELETE Card

The information content of the aforementioned cards has been completely specified in Sections 4.1.2 and 4.2.4.1.3.

A serial number, the DDI-NO, is present in columns 73-76 of each card in this file, and a Sequence Number in columns 78-80. The cards in this file are placed in order by Sequence Number within DDI-NO.

4.3.2 Function Operation

The Source Program Maintenance Module operates on an existing Source Program File directed by a Current File-SP to update and generate a new Source Program File. The control card associated with this program permits the user to specify options to print and/or punch the resulting new Source Program File.

The Source Program Maintenance Module provides the user with the ability to add information to the Source Program File, delete information from the Source Program File or replace information on the Source Program File on a card image by card image basis. The Current File-SP consists of individual cards ordered by DDI-NO and Sequence Number. Each card invokes an update function implicitly or explicitly. The cards within the Current File-SP permit the user to change any card in the Source Program File. The control card precedes the Current File-SP when submitted to the Source Program Maintenance Module.

Each card in the Current File-SP specifies an update function which performs one of the following operations:

1. ADD a card to the Source Program File
2. REPLACE a card on the Source Program File
3. DELETE one or more test modules from the Source Program File
4. DELETE an entire test module from the Source Program File

The update functions are controlled on the basis of two items included in every card in the Source Program File.

1. DDI-NO (columns 73-76)
2. Sequence Number (columns 78-80)

In order to reduce the card preparation requirements of the system, the ADD feature and REPLACE feature are invoked automatically. Specifically, the update functions adhere to the following rules.

ADD

If an ADD card (a card to be ADDED to the Source Program File) is included in the Current File-SP and no card with the same DDI-NO (columns 73-76) and a Sequence Number (columns 78-80) is present in the old Source Program File, the card on the Current File-SP is automatically added to the Source Program File in its proper sequence.

REPLACE

If a REPLACE card (a card intended to REPLACE another card in the Source Program File) is included in a packet on the Current File-SP and a card with the same DDI-NO (columns 73-76) and Sequence Number (columns 78-80) is present on the old Source Program File, the card on the Current File-SP automatically replaces the corresponding card on the new Source Program File.

DELETE

The DELETE option is invoked by means of a DELETE card included in the Current File-SP. This card causes a card with the same DDI-NO and Sequence Number not to be recorded on the new Source Program File. If the Sequence Number equals 000, the entire module specified by the DDI-NO and any directly succeeding modules with a B in column 77 in the Test Module Header are deleted.

4.3.3 Description of Expected Results

4.3.3.1 Output Card Formats

A complete description of all of the card forms contained in either the Source Program File or the Punch File-S is given in Section 4.1.2 and 4.2.4.1.3.

4.3.3.2 Output Files

The Source Program Maintenance Module produces three output files: The Source Program File, the Audit File-SP, and a Punch File-SP.

4.3.3.2.1 Source Program File

The Source Program File has been completely described in Section 4.2.4.2.1.

4.3.3.2.2 Audit File-SP

The Audit File-SP as an optional feature may contain a listing of all diagnostics and trace messages originating from this module. A second optional feature the user may request is to print on the Audit File-SP a working listing of the card images on the new Source Program File by selecting the print option on the Control Card-SP. Since the Audit File-SP is only a working listing, diagnostic and tracing information will be interspersed with the Source Program File card images on the Audit File-SP.

Following is a list of the diagnostic messages to be printed in the Audit File-SP together with their explanations:

<u>Diagnostic Message</u>	<u>Explanation</u>
NO UPDATE FUNCTION CARD	There is no control card preceding the Current File-SP.
RECORD TO BE DELETED NOT ON OLD MASTER FILE	The Current File-SP contains a DELETE card referencing a DDI-NO not on the old Source Program File.
CURRENT FILE CARDS ARE OUT OF SEQUENCE	The cards in the Current File-SP are not in sequence by DDI-NO.

Following is a list of the trace messages to be printed on the Audit File-SP.

The following messages are all paragraph names and are printed upon entering the paragraph:

1. IUC
2. UPDATE CONTROL
3. OLD MASTER FILE READOUT
4. END OF CURRENT FILE
5. END OF OLD MASTER FILE
6. END OF OLD MASTER FILE 4

The following typical trace message is printed whenever the WRITE-ERROR paragraph is entered:

LAST CARD KEY	0002A005
LAST CURRENT FILE KEY	0002A003
LAST OLD MASTER FILE KEY	0005A004

The information opposite the LAST CARD KEY represents the control field (columns 73-80) of the Current File-SP card read. The information opposite the LAST CURRENT FILE KEY represents the control field of the next to last Current File-SP card read. The information opposite LAST OLD MASTER FILE KEY represents the control field of the card image in the last physical record read from the old Source Program File. This trace information is printed on one line of the Audit File-SP.

4.3.3.2.3 Punch File-SP

Another option, the punch option, may be selected by the user to obtain a card deck of all card images on the Source Program File containing information.

4.4 Initiate Population File Module (INIPOP)

4.4.1 Purposes and Uses

This module may be used to assign new test serial numbers, DDI-NO's on the Population File. Renumbering the Population File might be required if the Test Modules were to be reorganized and placed in a different sequence or if within the current organizational structure of the Test Modules a new Test Module may not be assigned a convenient number relating it to its associated Test Modules.

Whatever the reason, INIPOP eliminates the necessity for re-keypunching the Population File card deck by automatically reassigning new DDI-NO's. The user is permitted to select the first new number to be assigned and an increment which will be added to successive assigned numbers to form new numbers for assignment. All DDI-NO

references on the Test Header card (including all mandatory DDI-NO's) and JOVIAL statement cards (including all mandatory DDI-NO references) will be updated to reflect the new number assignments.

Input to INIPOP consists of a Population File, in the form of a card deck or a magnetic tape, and a control card requesting specific options provided by the module.

Output from INIPOP includes a renumbered Population File, the Audit-File-IP, that contains diagnostic messages, an optional working listing on the Audit-File-IP consisting of those Population File card images containing information, and an optional Punch File-IP consisting of a card deck of all card images on the Population File containing information.

Population File modules recorded on cards may be renumbered in groups if desired. This feature of INIPOP is invoked on the card deck modules by placing control cards in the card deck before each independent group of modules to be renumbered. Each of the card deck modules following the control card will be renumbered according to the values given on the control card.

When invoking this feature on a Population File residing on tape, control cards designating the various renumbering conventions must also contain the DDI-NO of the last test module to which the current control card applies.

When a portion of the Population File is to be renumbered, the entire Population File should be submitted to INIPOP in order to ensure a correct resequencing of all embedded DDI-NO references. For those modules of the Population File not requiring renumbering, the control card must include the information that the following modules are to be included in the renumbering process but are not to be themselves renumbered.

4 4.2 Preparation of Inputs

4 4.2.1 Card Inputs

4 4.2.1.1 Control Card-IP

The various options provided by INIPOP may be requested by means of the following control card:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1	Control Card Indicator	This column must contain the character C denoting the card as a control card.
2-4	Control Card Identifier	These 3 columns may be assigned any 3 digits by the user to identify the control card.

<u>Columns</u>	<u>Name</u>	<u>Description</u>
5	Renumber Option*	The column is used to indicate to INIPOP that a renumbering of the Population File is required. non-space - Renumber space - Do not renumber
6-8	Card/Record	These 3 columns are used to designate the number of card images present in each record of the Population File.
9-12	Initial Number	These 4 columns are used to designate the first four digit DDI-NO to be assigned.
13-16	Increment	These 4 columns are used to designate the increment representing the difference between two successively assigned DDI-NO's.
17	Print Option	This column may be used to request the printing of the generated Population File non-space - Print space - Do not print
18	Punch Option	This column may be used to request the punching of the new Population File non-space - Punch space - Do not punch
19	Old Population File Option	This column may be used to signify that an old Population File residing on magnetic tape will be used as input. non-space - Magnetic tape input space - Card input
20-23	Record Maximum	These 4 columns are used to designate the DDI-NO of the last record to be incremented using the current initial number and increment.
24-80	Not Used	

*If renumbering is not selected, INIPOP may be used to initiate a Population File from a card deck or to copy an old Population File from one magnetic tape to the other. Print and punch options still apply.

When submitting this card to INIPOP, it precedes the Current File-PF if the Population File is to be generated from a card deck or it replaces the Current File-PF if the Population File is to be generated from an old Population File.

4.4.2.1.2 Other Card Inputs

A complete description of all other card forms contained in either the Population File or the Current File-PF is given in Section 4.1.2.

4.4.2.2 Input Files

The Initiate Population File Module operates on either of two input files, the Population File or the Current File-PF.

4.4.2.2.1 Population File

The Population File has been completely described in Section 4.1.2.4.1.

4.4.2.2.2 Current File-PF

The Current File-PF has been completely described in Section 4.1.2.4.2.

4.4.3 Function Operation

The Initiate Population File Module operates to initiate and, at the user's option, renumber a Population File from either a Current File-PF or from an existing Population File. Additional features selectable from the control card include the options to print a working listing of the generated Population File and/or to punch the resulting new Population File.

The Population File is renumbered by assigning to the first DDI-NO the value as stated on the Control Card-IP for the Initial Number; to the second DDI-NO, the Initial Value + Increment as stated on the Control Card-IP; the third DDI-NO, the Initial Value + 2 * Increment. For example, if the Initial Value was specified as 5 and the Increment was specified as 10, then the values assigned to the DDI-NO for each Test Module would be 5, 15, 25, etc., until the Test Modules had been exhausted.

4.4.4 Description of Expected Results

4.4.4.1 Output Card Formats

The output card formats correspond to the formats for cards described in Section 4.1.2.

4.4.4.2 Output Files

The Initiate Population File Module produces three files: The Population File, the Audit File-IP, and the Punch File-IP.

4.4.4.2.1 Population File

The Population File is completely described in Section 4.1.2.4.1.

4.4.4.2.2 Audit File-IP

The Audit File-IP contains a listing of all diagnostics originating from the module. As an optional feature, the user may request to print on the Audit File-IP, a working listing of the card images on the new Population File by selecting the print option on the Control Card-IP. Since the Audit File-IP is only a working listing, diagnostic information will be interspersed with the Population File card images on the Audit File-IP. If no diagnostics occur, however, the Audit File-IP will consist entirely of a listing of the Population File.

Following is a list of the diagnostic messages to be printed in the Audit File-IP together with their explanations:

<u>Diagnostic Message</u>	<u>Explanation</u>
UNEXPECTED EOF INFILE	There is an unexpected end of file encountered on the unit containing the control card and Current File-PF.
DDI-NO LARGER THAN 9997	Successive incrementing of the originally assigned Initial Number have generated a number greater than 9997. There are too many Test Modules being renumbered given the particular assigned values for Initial Value and/or Increment. Reduce either value or both and try again.
NO CONTROL CARD	The control card has not been submitted to INIPOP.

4.4.4.2.3 Punch File-IP

Another option, the punch option, may be selected by the user to obtain a card deck of all card images on the Population File containing information.

4.5 JCVS Report Writer Module (JCVSRP)

4.5.1 Purposes and Uses

This module may be used to produce a finished listing of a Population File and/or a listing of the Test Header Cards in a Population File.

Input to this module consists of a Population File and a control card specifying the options available to the user.

Output from JCVSRP may include a listing of either the Population File or the collection of Test Header Cards on the Population File or both. These reports are printed on the Audit File-RP together with any diagnostics and trace messages originating from this module.

4.5.2 Preparation of Inputs

4.5.2.1 Card Inputs

4.5.2.1.1 Control Card-RP

The various options provided by JCVSRP may be requested by the following control card:

<u>Columns</u>	<u>Name</u>	<u>Description</u>
1	Control Card Indicator	This column must contain the character C denoting the card as a control card.
2-3	Report Selection	These 2 columns are used to select the two reports generated by this module. Column 2: non-space - Population File Listing space - No Population File Listing Column 3: non-space - Cross Referencing Listing space - No Cross Referencing Listing
4-13 14-19	Not Used Date	These six columns specify the date as follows: 14-15 Month 16-17 Day 18-19 Year (Example: 040968)

<u>Columns</u>	<u>Name</u>	<u>Description</u>
20-61	Test Identification	These 42 columns are used to specify the computer name. The name may be positioned any place in the field.
62-63	Control Tape Size	These two columns are used to specify the number of lines per printer page that are available to be printed on.
64-65	Line/Record	These two columns are used to specify the number of cards per record on the Population File. In this case of JCVS this value is 50.
66-80	Not Used	

4.5.2.2 Input Files

The JCVS Report Writer Module operates on one input file, the Population File.

4.5.2.2.1 Population File

The Population File has been completely described in Section 4.1.2.4.1.

4.5.3 Function Operation

The JCVS Report Writer Module operates on a Population File to produce two reports, a listing of the Test Modules on the Population File and/or a listing of the Test Header Cards on the Population File. The JCVSRP is directed by means of user options selected on the Control Card-RP.

4.5.4 Description of Expected Results

The JCVSRP produces one file, the Audit File-RP.

4.5.4.1 Audit File-RP

The Audit File-RP may contain either a listing of all the Test Modules on a Population File or a listing of all of the Test Header Cards on a Population File or both. This is a formal listing in that no diagnostics or trace messages are interspersed. A trace message does, however, precede the writing of each report on a separate page.

Following is the diagnostic message to be printed in the Audit File-RP together with its explanation:

Diagnostic Message

UNEXPECTED EOF INFILE

Explanation

This problem results from attempting to read the Control Card-RP and getting an end of file condition. Check input to make sure the control card is present and is not preceded by any extra end of file cards.

Following is the trace message that is printed out on a separate page at the beginning of the writing of each report:

REPORT WRITER.

SECTION V

USAGE INSTRUCTION

Since the JCVS will operate on several different computers it would be advisable if the user availed himself of the following documents:

1. Implementors COBOL Manual
2. Implementors Operating System Manual
3. Implementors JOVIAL J3 Manual

5.1 JCVS Operating Philosophy

Although the JCVS is to operate on various computers, the functions that will be performed on each computer to utilize the JCVS will be identical. Each of the JCVS program modules is processible by either of the following two methods:

1. Compile Source Program and Go

Using this technique, the appropriate control cards, source program and data are submitted to the computer system. The system then compiles the source program and writes the resulting object program on the operating system's Load and Go unit. This object program is then loaded from the Load and Go unit and program executing follows.

2. Load Binary Deck and Go

Using this technique, the appropriate control cards, object program binary deck, and data is submitted to the computer system. The system then loads the object program from the object program binary deck and program execution follows.

5.2 JCVS Function

There are seven functions that are available to the user of the JCVS. They are given in the following list:

- | | |
|---|---------|
| 1. Create a new Population File | POPFI1 |
| 2. Update an old Population File | POPFI2 |
| 3. Generate a JOVIAL source program | SELECT |
| 4. Update a Source Program File | SOPMM |
| 5. Initiate a Population File from a
Population File card deck | INIPOP1 |

- | | | |
|----|--|---------|
| 6. | Initiate a new Population File from
an old Population File on magnetic tape | INIPOP2 |
| 7. | Write reports from Population File | JCVSRP |

5.3 Preparation of JCVS Input

5.3.1 Current File-PF

The Current File-PF which is used to update the Population File has been described in Section 4.1.2.4.2. An example of this file is given in Figures 5-1a, 5-1b, and 5-1c.

Notice all packets are in order by DDI-NO and that there are no DELETE packets.

5.3.2 Current File-SP

The Current File-SP which is used to update the Source Program File has been described in Section 4.3.1.2.2. An example of this file is given in Figure 5-2.

Notice that all of the cards in this file are in order by sequence number, columns 78-80 within DDI-NO, columns 73-76.

5.3.3 Test Selection File

The Test Selection File which directs the selection of the appropriate test modules has been described in Section 4.2.2.2.2. An example of this file is given in Figure 5-3.

This particular set of Test Selector Cards select the following test modules. In this example, it is assumed that no Mandatory DDI-NO's are involved.

5.4 Functional Processing

Diagrams will be proficed describing the status of the computer system at input time and again at output time for each function performed by the JCVS modules applying each operating philosophy and on each computer.

A complete list of these diagrams is given in Appendix 1.

5.5 Results of Operations

The JCVS modules generate magnetic tape output, printer listings and punched decks. The files associated with this output have already been completely described previously in this document. Actual samples of computer generated output will now be presented.

5.5.1 Printed Output

TEST MODULE	0002	JOVIAL STATEMENT	003	ADD A CARD	0002J003
TEST MODULE	0009	JOVIAL STATEMENT	050	ADD A CARD	0009J050
TEST MODULE NAME	10 2427 2428 2429			M	0010A001
TEST MODULE	0010	JOVIAL STATEMENT	001		0010J002
TEST MODULE	0010	JOVIAL STATEMENT	002		0010J003
TEST MODULE	0010	JOVIAL STATEMENT	003		0010J004
TEST MODULE	0010	JOVIAL STATEMENT	004		0010J005
TEST MODULE	0010	JOVIAL STATEMENT	005		0010J006
TEST MODULE	0010	JOVIAL STATEMENT	006		0010J007
TEST MODULE	0010	JOVIAL STATEMENT	007		0010J008
TEST MODULE	0010	JOVIAL STATEMENT	008		0010J009
TEST MODULE	0010	JOVIAL STATEMENT	009		0010J010
TEST MODULE	0010	JOVIAL STATEMENT	010		0010J011
TEST MODULE	0010	JOVIAL STATEMENT	011		0010J012
TEST MODULE	0010	JOVIAL STATEMENT	012		0010J013
TEST MODULE	0010	JOVIAL STATEMENT	013		0010J014
TEST MODULE	0010	JOVIAL STATEMENT	014		0010J015
TEST MODULE	0010	JOVIAL STATEMENT	015		0010J016
TEST MODULE	0010	JOVIAL STATEMENT	016		0010J017
TEST MODULE	0010	JOVIAL STATEMENT	017		0010J018
TEST MODULE	0010	JOVIAL STATEMENT	018		0010J019
TEST MODULE	0010	JOVIAL STATEMENT	019		0010J020
TEST MODULE	0010	JOVIAL STATEMENT	020		0010J021
TEST MODULE	0010	JOVIAL STATEMENT	021		0010J022
TEST MODULE	0010	JOVIAL STATEMENT	022		0010J023
TEST MODULE	0010	JOVIAL STATEMENT	023		0010J024
TEST MODULE	0010	JOVIAL STATEMENT	024		0010J025
TEST MODULE	0010	JOVIAL STATEMENT	025		0010J026
TEST MODULE	0010	JOVIAL STATEMENT	026		0010J027
TEST MODULE	0010	JOVIAL STATEMENT	027		0010J028
TEST MODULE	0010	JOVIAL STATEMENT	028		0010J029
TEST MODULE	0010	JOVIAL STATEMENT	029		0010J030
TEST MODULE	0010	JOVIAL STATEMENT	030		0010J031
TEST MODULE	0010	JOVIAL STATEMENT	031		0010J032
TEST MODULE	0010	JOVIAL STATEMENT	032		0010J033
TEST MODULE	0010	JOVIAL STATEMENT	033		0010J034
TEST MODULE	0010	JOVIAL STATEMENT	034		0010J035
TEST MODULE	0010	JOVIAL STATEMENT	035		0010J036
TEST MODULE	0010	JOVIAL STATEMENT	036		0010J037
TEST MODULE	0010	JOVIAL STATEMENT	037		0010J038
TEST MODULE	0010	JOVIAL STATEMENT	038		0010J039
TEST MODULE	0010	JOVIAL STATEMENT	039		0010J040
TEST MODULE	0010	JOVIAL STATEMENT	040		0010J041
TEST MODULE	0010	JOVIAL STATEMENT	041		0010J042
TEST MODULE	0010	JOVIAL STATEMENT	042		0010J043
TEST MODULE	0010	JOVIAL STATEMENT	043		0010J044
TEST MODULE	0010	JOVIAL STATEMENT	044		0010J045
TEST MODULE	0010	JOVIAL STATEMENT	045		0010J046
TEST MODULE	0010	JOVIAL STATEMENT	046		0010J047
TEST MODULE	0010	JOVIAL STATEMENT	047		0010J048
TEST MODULE	0010	JOVIAL STATEMENT	048		0010J049
TEST MODULE	0010	JOVIAL STATEMENT	049		0010J050
TEST MODULE	0011	JOVIAL STATEMENT	015	REPLACE A CARD	0011J015
TEST MODULE	0012	JOVIAL STATEMENT	004	REPLACE A CARD	0012J004
TEST MODULE	0013	JOVIAL STATEMENT		DELETE MODULE 13	0013D000
TEST MODULE NAME	14 2437				0014A001

Figure 5-1a Current File-PF

TEST MODULE 0014 JOVIAL STATEMENT 001		0014J002
TEST MODULE 0014 JOVIAL STATEMENT 003		0014J004
TEST MODULE 0014 JOVIAL STATEMENT 005		0014J006
TEST MODULE 0014 JOVIAL STATEMENT 007		0014J008
TEST MODULE 0014 JOVIAL STATEMENT 009		0014J010
TEST MODULE 0014 JOVIAL STATEMENT 011		0014J012
TEST MODULE 0014 JOVIAL STATEMENT 013		0014J014
TEST MODULE 0014 JOVIAL STATEMENT 015		0014J016
TEST MODULE 0014 JOVIAL STATEMENT 017		0014J018
TEST MODULE 0014 JOVIAL STATEMENT 019		0014J020
TEST MODULE 0014 JOVIAL STATEMENT 021		0014J022
TEST MODULE 0014 JOVIAL STATEMENT 023		0014J024
TEST MODULE 0014 JOVIAL STATEMENT 025		0014J026
TEST MODULE 0014 JOVIAL STATEMENT 027		0014J028
TEST MODULE 0014 JOVIAL STATEMENT 029		0014J030
TEST MODULE 0014 JOVIAL STATEMENT 031		0014J032
TEST MODULE 0014 JOVIAL STATEMENT 033		0014J034
TEST MODULE 0014 JOVIAL STATEMENT 035		0014J036
TEST MODULE 0014 JOVIAL STATEMENT 037		0014J038
TEST MODULE 0014 JOVIAL STATEMENT 039		0014J040
TEST MODULE 0014 JOVIAL STATEMENT 041		0014J042
TEST MODULE 0014 JOVIAL STATEMENT 043		0014J044
TEST MODULE 0014 JOVIAL STATEMENT 045		0014J046
TEST MODULE 0014 JOVIAL STATEMENT 047		0014J048
TEST MODULE 0014 JOVIAL STATEMENT 049		0014J050
TEST MODULE 0015 JOVIAL STATEMENT 003	DELETE A CARD	0015D003
TEST MODULE 0016 JOVIAL STATEMENT 020	REPLACE A CARD	0016J020
TEST MODULE 0017 JOVIAL STATEMENT 006	ADD A CARD	0017J006
TEST MODULE 0017 JOVIAL STATEMENT 021	REPLACE A CARD	0017J021
TEST MODULE 0018 JOVIAL STATEMENT 007	ADD A CARD	0018J007
TEST MODULE NAME 19 2445	0016''	0019A001
TEST MODULE 0019 JOVIAL STATEMENT 002		0019J003
TEST MODULE 0019 JOVIAL STATEMENT 004		0019J005
TEST MODULE 0019 JOVIAL STATEMENT 006		0019J007
TEST MODULE 0019 JOVIAL STATEMENT 008		0019J009
TEST MODULE 0019 JOVIAL STATEMENT 010		0019J011
TEST MODULE 0019 JOVIAL STATEMENT 012		0019J013
TEST MODULE 0019 JOVIAL STATEMENT 014		0019J015
TEST MODULE 0019 JOVIAL STATEMENT 016		0019J017
TEST MODULE 0019 JOVIAL STATEMENT 018		0019J019
TEST MODULE 0019 JOVIAL STATEMENT 020		0019J021
TEST MODULE 0019 JOVIAL STATEMENT 022		0019J023
TEST MODULE 0019 JOVIAL STATEMENT 024		0019J025
TEST MODULE 0019 JOVIAL STATEMENT 026		0019J027
TEST MODULE 0019 JOVIAL STATEMENT 028		0019J029
TEST MODULE 0019 JOVIAL STATEMENT 030		0019J031
TEST MODULE 0019 JOVIAL STATEMENT 032		0019J033
TEST MODULE 0019 JOVIAL STATEMENT 034		0019J035
TEST MODULE 0019 JOVIAL STATEMENT 036		0019J037
TEST MODULE 0019 JOVIAL STATEMENT 038		0019J039
TEST MODULE 0019 JOVIAL STATEMENT 040		0019J041
TEST MODULE 0019 JOVIAL STATEMENT 042		0019J043
TEST MODULE 0019 JOVIAL STATEMENT 044		0019J045
TEST MODULE 0019 JOVIAL STATEMENT 046		0019J047
TEST MODULE 0019 JOVIAL STATEMENT 048		0019J049
TEST MODULE 0021 JOVIAL STATEMENT	REPLACE MODULE 21	0021D000

Figure 5-1b Current File-PF

TEST MODULE 0021 JOVIAL STATEMENT 001	REPLACE MODULE 21	0021A001
TEST MODULE 0021 JOVIAL STATEMENT 002	REPLACE MODULE 21	0021J002
TEST MODULE 0021 JOVIAL STATEMENT 003	REPLACE MODULE 21	0021J003
TEST MODULE 0021 JOVIAL STATEMENT 004	REPLACE MODULE 21	0021J004
TEST MODULE 0021 JOVIAL STATEMENT 005	REPLACE MODULE 21	0021J005
TEST MODULE 0021 JOVIAL STATEMENT 010	REPLACE MODULE 21	0021J010
TEST MODULE 0021 JOVIAL STATEMENT 025	REPLACE MODULE 21	0021J025
TEST MODULE 0021 JOVIAL STATEMENT 050	REPLACE MODULE 21	0021J050
TEST MODULE 0022 JOVIAL STATEMENT 032	DELETE A CARD	0022D032
TEST MODULE 0023 JOVIAL STATEMENT 007	DELETE A CARD	0023D007
TEST MODULE 0024 JOVIAL STATEMENT 026	DELETE A CARD	0024D026
TEST MODULE 0025 JOVIAL STATEMENT	DELETE MODULE 25	0025D000

Figure 5-1c Current File-PF

TEST MODULE	0003	JOVIAL	STATEMENT	004	ADD A CARD	0003J004
TEST MODULE	0003	JOVIAL	STATEMENT	005	DELETE A CARD	0003D005
TEST MODULE	0008	JOVIAL	STATEMENT	024	DELETE A CARD	0008D024
TEST MODULE	0008	JOVIAL	STATEMENT	036	REPLACE A CARD	0008J036
TEST MODULE	0009	JOVIAL	STATEMENT	020	ADD A CARD	0009J020
TEST MODULE	0011	JOVIAL	STATEMENT	017	REPLACE A CARD	0011J017
TEST MODULE	0012	JOVIAL	STATEMENT	031	ADD A CARD	0012J031
TEST MODULE	0013	JOVIAL	STATEMENT	021	REPLACE A CARD	0013J021
TEST MODULE	0024	JOVIAL	STATEMENT	020	DELETE A CARD	0024D020
TEST MODULE	0024	JOVIAL	STATEMENT	025	ADD A CARD	0024J025
TEST MODULE	0024	JOVIAL	STATEMENT	050	REPLACE A CARD	0024J050
TEST MODULE	0025	JOVIAL	STATEMENT	017	DELETE A CARD	0025D017

Figure 5-2 Current File-SP

T	0002		
T	0003	0003	0012
T	0025	0000	
T	0024		
T	0005		
T	0009	0002	0013

Figure 5-3 Test Selection File

5.5.1.1 Population File

Figure 5-4 shows portions of a tape dump of the Population File from the GE-635. Exact positions of the test statements within the block should be noted. Since this is test information, the content of the various cards in the record are not actual JOVIAL statements but indications as to where Population File information would replace the checkout statements.

5.5.1.2 Audit File-PF

Figure 5-5 presents a portion of the listing of the Audit File-PF generated by POPFM on the GE-635. Notice diagnostic and trace messages interspersed with the list of the new Population File.

5.5.1.3 Audit File-S

Figures 5-6A and 5-6B present a portion of the Audit File-S generated by SJCVS on the GE-635.

5.5.1.4 Audit File-SP

Figure 5-7 presents a portion of the Audit File-SP generated by SOPMM on the GE-635. Notice that no trace messages appear in the listing giving the user a "clean" listing of the new Source Program File.

5.5.1.5 Audit File-IP

Figure 5-8 presents a portion of the Audit File-IP generated by INIPOP on the GE-635. The diagnostic messages 'MANDATORY MODULE NOT ON POPULATION FILE' are printed but processing is permitted to continue. Notice that no trace messages appear on the listing giving the user a "clean" listing (except for diagnostics) of the new Population File.

5.5.1.6 Audit File-RP

Figures 5-9A and 5-9B present a portion of a listing of the Audit File-RP generated by JCVSRP on the GE-635. The trace message appears on a separate page thereby giving the user a "clean" listing of the two reports: The POPULATION FILE and the CROSS REFERENCE TABLE.

5.5.2 Punched Output

S UTILITY

S TAPE F1,X3R

S FFIL F1,PHYREC

S FUTIL F1,RYD/F1,DUMP/1F/

FILE #	1 -- RECORD #	2 -- FILE CODE - F1	3 -- REPORT CODE XX	4 -- MODE----	5 -- BCD-	6 -- DENSITY----	7 -- HIGH-
1	202064622124	522562242020	203021456223	464420212622	202027255206	USAF-ESD	HANSCOM AFB GE-6
6	030520204121	452003002001	110611000141	214520011120	011106111202	35 JAN 30 1969	JAN 19 1969
11	202020202020	202020202020	000000012100	000141466531	214320234644	0001A001J0VIAL COM	0001A001J0VIAL COM
16	473143255120	652143312421	633146452062	706263254420	012020202020	PILER VALIDATION SYSTEM 1	0001A001J0VIAL COM
21	202020202020	202020202020	272523466220	202020202020	202020202020	GEOS	0001A002A1
26	202000000001	210000022101	202020202020	202020202020	202020202020	0001A002A1	0001A002A1
31	202020202020	202020202102	20264512043	316263314527	202020202020	A2 FOR LISTING	0001A003
36	202020202020	202020202020	200605422020	202020200000	000121000003	A5 FOR CARDS	0001A003
41	210520264651	202321512462	202020202020	202020202020	202020202020	A3	0001A004A4
46	210320202020	202020202020	202020202020	202020202020	202020202020	A6	0001A004A4
51	202020202020	202020202020	000000012100	000421042020	202020202020	0001A005	0001A005
56	202020202020	202020202020	202020202020	202021062020	202020202020	LEADING OPERATING SYSTE	0001L010
61	202020202020	202020202020	202020202020	202020202020	202020202020	M CONTROL CARD 001	0001L010
66	202000000001	210000052020	202020202020	202020202020	202020202020	DING OPERATING SYSTEM CONTROL	0001L011
71	202020202020	202020202020	202020202020	202020202020	202020202020	TING SYSTEM CONTROL CARD 003	0001L012
121*	202020202020	204325212431	452720464725	512163314527	206270626325	FINAL OPERATING SYSTE	0001F013
126	442023464563	514643202321	512420200000	012020202020	202020202020	M CONTROL CARD 001	0001F013
131	202020202020	202020202020	000000014300	010020202020	202020432521	DING OPERATING SYSTEM CONTROL	0001L012
136	243145272046	472551216331	452720464725	632544202346	456351464320	TING SYSTEM CONTROL CARD 003	0001L012
141	232151242020	000002202020	202020202020	202020202020	202020202020	FINAL OPERATING SYSTE	0001F013
146	202000000001	430001012020	202020202043	252124314527	204647255121	M CONTROL CARD 001	0001F013
151	633145272062	706263254420	234645635146	432023215124	202000000320	DING OPERATING SYSTEM CONTROL	0001L014
156	202020202020	202020202020	202020202020	202020200000	000143000102	TING SYSTEM CONTROL CARD 003	0001L012
161	202020202020	202631452143	202020464725	512163314527	206270626325	FINAL OPERATING SYSTE	0001F013
166	442023464563	514643202321	512420200000	012020202020	202020202020	M CONTROL CARD 001	0001F013
171	202020202020	202020202020	000000012600	010320202020	202020432521	DING OPERATING SYSTEM CONTROL	0001L014
176	243145272046	472551216331	452720464725	632544202346	456351464320	TING SYSTEM CONTROL CARD 002	0001F021
181	232151242020	000004202020	202020202020	202020202020	202020202020	FINAL OPERATING SYSTE	0001F021
186	202000000001	430001042020	202020202020	202020202020	202020202020	M CONTROL CARD 003	0001F021
191	202020202020	202020202020	202020202020	202020202020	202020202020	TING SYSTEM CONTROL CARD 002	0001F021
266*	202020202020	202631452143	202020464725	512163314527	206270626325	FINAL OPERATING SYSTE	0001F021
271	633145272062	706263254420	234645635146	432023215124	202000000220	M CONTROL CARD 003	0001F021
276	202020202020	202020202020	202020202020	202020200000	000126000801	TING SYSTEM CONTROL CARD 002	0001F021
281	202020202020	202020202020	202020202020	202020202020	202020202020	FINAL OPERATING SYSTE	0001F021
321*	202020202020	202631452143	202020464725	512163314527	206270626325	M CONTROL CARD 003	0001F021
326	442023464563	514643202321	512420200000	032020202020	202020202020	TING SYSTEM CONTROL CARD 002	0001F021
331	202020202020	202020202020	000000012600	020520202020	202020202020	FINAL OPERATING SYSTE	0001F021
336	202020202020	202020202020	202020202020	202020202020	202020202020	M CONTROL CARD 003	0001F021
666*	202020202020	202020202000	202020202020	202020202020	202020202020	00	00

FILE #	1 -- RECORD #	2 -- FILE CODE - F1	3 -- REPORT CODE XX	4 -- MODE----	5 -- BCD-	6 -- DENSITY----	7 -- HIGH-
1	202064622124	522562242020	203021456223	464420212622	202027255206	USAF-ESD	HANSCOM AFB GE-6

Figure 5-4 Population File Tape Dump, GE-635

TEST MODULE 0015	JOVIAL STATEMENT 013	0015J014
TEST MODULE 0015	JOVIAL STATEMENT 014	0015J015
TEST MODULE 0015	JOVIAL STATEMENT 015	0015J016
TEST MODULE 0015	JOVIAL STATEMENT 016	0015J017
TEST MODULE 0015	JOVIAL STATEMENT 017	0015J018
TEST MODULE 0015	JOVIAL STATEMENT 018	0015J019
TEST MODULE 0015	JOVIAL STATEMENT 019	0015J020
TEST MODULE 0015	JOVIAL STATEMENT 020	0015J021
TEST MODULE 0015	JOVIAL STATEMENT 021	0015J022
TEST MODULE 0015	JOVIAL STATEMENT 022	0015J023
TEST MODULE 0015	JOVIAL STATEMENT 023	0015J024
TEST MODULE 0015	JOVIAL STATEMENT 024	0015J025
TEST MODULE 0015	JOVIAL STATEMENT 025	0015J026
TEST MODULE 0015	JOVIAL STATEMENT 026	0015J027
TEST MODULE 0015	JOVIAL STATEMENT 027	0015J028
TEST MODULE 0015	JOVIAL STATEMENT 028	0015J029
TEST MODULE 0015	JOVIAL STATEMENT 029	0015J030
TEST MODULE 0015	JOVIAL STATEMENT 030	0015J031
TEST MODULE 0015	JOVIAL STATEMENT 031	0015J032
TEST MODULE 0015	JOVIAL STATEMENT 032	0015J033
TEST MODULE 0015	JOVIAL STATEMENT 033	0015J034
TEST MODULE 0015	JOVIAL STATEMENT 034	0015J035
TEST MODULE 0015	JOVIAL STATEMENT 035	0015J036
TEST MODULE 0015	JOVIAL STATEMENT 036	0015J037
TEST MODULE 0015	JOVIAL STATEMENT 037	0015J038
TEST MODULE 0015	JOVIAL STATEMENT 038	0015J039
TEST MODULE 0015	JOVIAL STATEMENT 039	0015J040
TEST MODULE 0015	JOVIAL STATEMENT 040	0015J041
TEST MODULE 0015	JOVIAL STATEMENT 041	0015J042
TEST MODULE 0015	JOVIAL STATEMENT 042	0015J043
TEST MODULE 0015	JOVIAL STATEMENT 043	0015J044
TEST MODULE 0015	JOVIAL STATEMENT 044	0015J045
TEST MODULE 0015	JOVIAL STATEMENT 045	0015J046
TEST MODULE 0015	JOVIAL STATEMENT 046	0015J047
TEST MODULE 0015	JOVIAL STATEMENT 047	0015J048
TEST MODULE 0015	JOVIAL STATEMENT 048	0015J049
TEST MODULE 0015	JOVIAL STATEMENT 049	0015J050

UPDATE CONTROL
 LAST CARD KEY 0016J020 LAST CURRENT FILE KEY 0015D003 LAST OLD MASTER FILE KEY 0016A001

TEST MODULE NAME 16 2441 2442		0016A001
TEST MODULE 0016	JOVIAL STATEMENT 001	0016J002
TEST MODULE 0016	JOVIAL STATEMENT 003	0016J004
TEST MODULE 0016	JOVIAL STATEMENT 005	0016J006
TEST MODULE 0016	JOVIAL STATEMENT 007	0016J008
TEST MODULE 0016	JOVIAL STATEMENT 009	0016J010
TEST MODULE 0016	JOVIAL STATEMENT 011	0016J012
TEST MODULE 0016	JOVIAL STATEMENT 013	0016J014
TEST MODULE 0016	JOVIAL STATEMENT 015	0016J016
TEST MODULE 0016	JOVIAL STATEMENT 017	0016J018
TEST MODULE 0016	JOVIAL STATEMENT 020	0016J020
TEST MODULE 0016	JOVIAL STATEMENT 021	0016J022
TEST MODULE 0016	JOVIAL STATEMENT 023	0016J024
TEST MODULE 0016	JOVIAL STATEMENT 025	0016J026
TEST MODULE 0016	JOVIAL STATEMENT 027	0016J028
TEST MODULE 0016	JOVIAL STATEMENT 029	0016J030
TEST MODULE 0016	JOVIAL STATEMENT 031	0016J032
TEST MODULE 0016	JOVIAL STATEMENT 033	0016J034
TEST MODULE 0016	JOVIAL STATEMENT 035	0016J036

REPLACE A CARD

BDT1
0002
BDT1
0003
0006
0009
0012
BDT1
0025
BDT1
0024
BDT1
0005
BDT1
0009
0011
0013
BDT1
BMT1
BMT1
BMT1
BMT1
0003
BMT1
0003
0008
0006
0012
BMT1
BMT1
BMT1
BMT1
BMT1
BUILD-SPF

0001J010
0001J011
0001J012
0001J014
0001J051

LEADING OPERATING SYSTEM CONTROL CARD 001
LEADING OPERATING SYSTEM CONTROL CARD 002
LEADING OPERATING SYSTEM CONTROL CARD 003
LEADING OPERATING SYSTEM CONTROL CARD 004

START

00TEST MODULE NAME 02 2407 2408 2409

TEST MODULE 0002 JOVIAL STATEMENT 001
TEST MODULE 0002 JOVIAL STATEMENT 003
TEST MODULE 0002 JOVIAL STATEMENT 005
TEST MODULE 0002 JOVIAL STATEMENT 007
TEST MODULE 0002 JOVIAL STATEMENT 009
TEST MODULE 0002 JOVIAL STATEMENT 011
TEST MODULE 0002 JOVIAL STATEMENT 013
TEST MODULE 0002 JOVIAL STATEMENT 015
TEST MODULE 0002 JOVIAL STATEMENT 017
TEST MODULE 0002 JOVIAL STATEMENT 019
TEST MODULE 0002 JOVIAL STATEMENT 021
TEST MODULE 0002 JOVIAL STATEMENT 023
TEST MODULE 0002 JOVIAL STATEMENT 025
TEST MODULE 0002 JOVIAL STATEMENT 027
TEST MODULE 0002 JOVIAL STATEMENT 029
TEST MODULE 0002 JOVIAL STATEMENT 031
TEST MODULE 0002 JOVIAL STATEMENT 033
TEST MODULE 0002 JOVIAL STATEMENT 035
TEST MODULE 0002 JOVIAL STATEMENT 037
TEST MODULE 0002 JOVIAL STATEMENT 039
TEST MODULE 0002 JOVIAL STATEMENT 041
TEST MODULE 0002 JOVIAL STATEMENT 043
TEST MODULE 0002 JOVIAL STATEMENT 045
TEST MODULE 0002 JOVIAL STATEMENT 047
TEST MODULE 0002 JOVIAL STATEMENT 049

0002J001
0002J002
0002J004
0002J006
0002J008
0002J010
0002J012
0002J014
0002J016
0002J018
0002J020
0002J022
0002J024
0002J026
0002J028
0002J030
0002J032
0002J034
0002J036
0002J038
0002J040
0002J042
0002J044
0002J046
0002J048
0002J050

00TEST MODULE NAME 03 2410 2411 2412 2413

TEST MODULE 0003 JOVIAL STATEMENT 002
TEST MODULE 0003 JOVIAL STATEMENT 004
TEST MODULE 0003 JOVIAL STATEMENT 006
TEST MODULE 0003 JOVIAL STATEMENT 008
TEST MODULE 0003 JOVIAL STATEMENT 010
TEST MODULE 0003 JOVIAL STATEMENT 012
TEST MODULE 0003 JOVIAL STATEMENT 014
TEST MODULE 0003 JOVIAL STATEMENT 016
TEST MODULE 0003 JOVIAL STATEMENT 018
TEST MODULE 0003 JOVIAL STATEMENT 020
TEST MODULE 0003 JOVIAL STATEMENT 022
TEST MODULE 0003 JOVIAL STATEMENT 024
TEST MODULE 0003 JOVIAL STATEMENT 026
TEST MODULE 0003 JOVIAL STATEMENT 028
TEST MODULE 0003 JOVIAL STATEMENT 030
TEST MODULE 0003 JOVIAL STATEMENT 032
TEST MODULE 0003 JOVIAL STATEMENT 034
TEST MODULE 0003 JOVIAL STATEMENT 036
TEST MODULE 0003 JOVIAL STATEMENT 038
TEST MODULE 0003 JOVIAL STATEMENT 040
TEST MODULE 0003 JOVIAL STATEMENT 042
TEST MODULE 0003 JOVIAL STATEMENT 044
TEST MODULE 0003 JOVIAL STATEMENT 046
TEST MODULE 0003 JOVIAL STATEMENT 048

0003A001
0003J003
0003J005
0003J007
0003J009
0003J011
0003J013
0003J015
0003J017
0003J019
0003J021
0003J023
0003J025
0003J027
0003J029
0003J031
0003J033
0003J035
0003J037
0003J039
0003J041
0003J043
0003J045
0003J047
0003J049

00TEST MODULE NAME 05 2415 2416 2417 2418 2419 2420 00

0005A001

MANDATORY MODULE NOT ON POPULATION FILE

002500

2439 2440

00TEST

TEST MODULE 0015 JOVIAL STATEMENT 001	0005A001
TEST MODULE 0015 JOVIAL STATEMENT 002	0005J002
TEST MODULE 0015 JOVIAL STATEMENT 003	0005J003
TEST MODULE 0015 JOVIAL STATEMENT 004	0005J004
TEST MODULE 0015 JOVIAL STATEMENT 005	0005J005
TEST MODULE 0015 JOVIAL STATEMENT 006	0005J006
TEST MODULE 0015 JOVIAL STATEMENT 007	0005J007
TEST MODULE 0015 JOVIAL STATEMENT 008	0005J008
TEST MODULE 0015 JOVIAL STATEMENT 009	0005J009
TEST MODULE 0015 JOVIAL STATEMENT 010	0005J010
TEST MODULE 0015 JOVIAL STATEMENT 011	0005J011
TEST MODULE 0015 JOVIAL STATEMENT 012	0005J012
TEST MODULE 0015 JOVIAL STATEMENT 013	0005J013
TEST MODULE 0015 JOVIAL STATEMENT 014	0005J014
TEST MODULE 0015 JOVIAL STATEMENT 015	0005J015
TEST MODULE 0015 JOVIAL STATEMENT 016	0005J016
TEST MODULE 0015 JOVIAL STATEMENT 017	0005J017
TEST MODULE 0015 JOVIAL STATEMENT 018	0005J018
TEST MODULE 0015 JOVIAL STATEMENT 019	0005J019
TEST MODULE 0015 JOVIAL STATEMENT 020	0005J020
TEST MODULE 0015 JOVIAL STATEMENT 021	0005J021
TEST MODULE 0015 JOVIAL STATEMENT 022	0005J022
TEST MODULE 0015 JOVIAL STATEMENT 023	0005J023
TEST MODULE 0015 JOVIAL STATEMENT 024	0005J024
TEST MODULE 0015 JOVIAL STATEMENT 025	0005J025
TEST MODULE 0015 JOVIAL STATEMENT 026	0005J026
TEST MODULE 0015 JOVIAL STATEMENT 027	0005J027
TEST MODULE 0015 JOVIAL STATEMENT 028	0005J028
TEST MODULE 0015 JOVIAL STATEMENT 029	0005J029
TEST MODULE 0015 JOVIAL STATEMENT 030	0005J030
TEST MODULE 0015 JOVIAL STATEMENT 031	0005J031
TEST MODULE 0015 JOVIAL STATEMENT 032	0005J032
TEST MODULE 0015 JOVIAL STATEMENT 033	0005J033
TEST MODULE 0015 JOVIAL STATEMENT 034	0005J034
TEST MODULE 0015 JOVIAL STATEMENT 035	0005J035
TEST MODULE 0015 JOVIAL STATEMENT 036	0005J036
TEST MODULE 0015 JOVIAL STATEMENT 037	0005J037
TEST MODULE 0015 JOVIAL STATEMENT 038	0005J038
TEST MODULE 0015 JOVIAL STATEMENT 039	0005J039
TEST MODULE 0015 JOVIAL STATEMENT 040	0005J040
TEST MODULE 0015 JOVIAL STATEMENT 041	0005J041
TEST MODULE 0015 JOVIAL STATEMENT 042	0005J042
TEST MODULE 0015 JOVIAL STATEMENT 043	0005J043
TEST MODULE 0015 JOVIAL STATEMENT 044	0005J044
TEST MODULE 0015 JOVIAL STATEMENT 045	0005J045
TEST MODULE 0015 JOVIAL STATEMENT 046	0005J046
TEST MODULE 0015 JOVIAL STATEMENT 047	0005J047
TEST MODULE 0015 JOVIAL STATEMENT 048	0005J048
TEST MODULE 0015 JOVIAL STATEMENT 049	0005J049
TEST MODULE 0015 JOVIAL STATEMENT 050	0005J050

MANDATORY MODULE NOT ON POPULATION FILE

00

2425 2426

00TEST

TEST MODULE 0009 JOVIAL STATEMENT 002	0015A001
TEST MODULE 0009 JOVIAL STATEMENT 004	0015J003
TEST MODULE 0009 JOVIAL STATEMENT 006	0015J005
TEST MODULE 0009 JOVIAL STATEMENT 008	0015J007
TEST MODULE 0009 JOVIAL STATEMENT 010	0015J009
TEST MODULE 0009 JOVIAL STATEMENT 012	0015J011
TEST MODULE 0009 JOVIAL STATEMENT 013	0015J013

POPULATION FILE
GENERAL ELECTRIC 635
NOV 30 1968

TEST	MODULE	NAME	15	2438	2439	2440	0014	00	0015A001
TEST	MODULE	0015	JOVIAL	STATEMENT	001				0015J002
TEST	MODULE	0015	JOVIAL	STATEMENT	002				0015J003
TEST	MODULE	0015	JOVIAL	STATEMENT	003				0015J004
TEST	MODULE	0015	JOVIAL	STATEMENT	004				0015J005
TEST	MODULE	0015	JOVIAL	STATEMENT	005				0015J006
TEST	MODULE	0015	JOVIAL	STATEMENT	006				0015J007
TEST	MODULE	0015	JOVIAL	STATEMENT	007				0015J008
TEST	MODULE	0015	JOVIAL	STATEMENT	008				0015J009
TEST	MODULE	0015	JOVIAL	STATEMENT	009				0015J010
TEST	MODULE	0015	JOVIAL	STATEMENT	010				0015J011
TEST	MODULE	0015	JOVIAL	STATEMENT	011				0015J012
TEST	MODULE	0015	JOVIAL	STATEMENT	012				0015J013
TEST	MODULE	0015	JOVIAL	STATEMENT	013				0015J014
TEST	MODULE	0015	JOVIAL	STATEMENT	014				0015J015
TEST	MODULE	0015	JOVIAL	STATEMENT	015				0015J016
TEST	MODULE	0015	JOVIAL	STATEMENT	016				0015J017
TEST	MODULE	0015	JOVIAL	STATEMENT	017				0015J018
TEST	MODULE	0015	JOVIAL	STATEMENT	018				0015J019
TEST	MODULE	0015	JOVIAL	STATEMENT	019				0015J020
TEST	MODULE	0015	JOVIAL	STATEMENT	020				0015J021
TEST	MODULE	0015	JOVIAL	STATEMENT	021				0015J022
TEST	MODULE	0015	JOVIAL	STATEMENT	022				0015J023
TEST	MODULE	0015	JOVIAL	STATEMENT	023				0015J024
TEST	MODULE	0015	JOVIAL	STATEMENT	024				0015J025
TEST	MODULE	0015	JOVIAL	STATEMENT	025				0015J026
TEST	MODULE	0015	JOVIAL	STATEMENT	026				0015J027
TEST	MODULE	0015	JOVIAL	STATEMENT	027				0015J028
TEST	MODULE	0015	JOVIAL	STATEMENT	028				0015J029
TEST	MODULE	0015	JOVIAL	STATEMENT	029				0015J030
TEST	MODULE	0015	JOVIAL	STATEMENT	030				0015J031
TEST	MODULE	0015	JOVIAL	STATEMENT	031				0015J032
TEST	MODULE	0015	JOVIAL	STATEMENT	032				0015J033
TEST	MODULE	0015	JOVIAL	STATEMENT	033				0015J034
TEST	MODULE	0015	JOVIAL	STATEMENT	034				0015J035
TEST	MODULE	0015	JOVIAL	STATEMENT	035				0015J036
TEST	MODULE	0015	JOVIAL	STATEMENT	036				0015J037
TEST	MODULE	0015	JOVIAL	STATEMENT	037				0015J038
TEST	MODULE	0015	JOVIAL	STATEMENT	038				0015J039
TEST	MODULE	0015	JOVIAL	STATEMENT	039				0015J040
TEST	MODULE	0015	JOVIAL	STATEMENT	040				0015J041
TEST	MODULE	0015	JOVIAL	STATEMENT	041				0015J042
TEST	MODULE	0015	JOVIAL	STATEMENT	042				0015J043
TEST	MODULE	0015	JOVIAL	STATEMENT	043				0015J044
TEST	MODULE	0015	JOVIAL	STATEMENT	044				0015J045
TEST	MODULE	0015	JOVIAL	STATEMENT	045				0015J046
TEST	MODULE	0015	JOVIAL	STATEMENT	046				0015J047
TEST	MODULE	0015	JOVIAL	STATEMENT	047				0015J048
TEST	MODULE	0015	JOVIAL	STATEMENT	048				0015J049
TEST	MODULE	0015	JOVIAL	STATEMENT	049				0015J050

CROSS REFERENCE TABLE
GENERAL ELECTRIC 635

NOV 30 1968

DDI NUMBER	TEST NAME	CED-NO	CED-NO	CED-NO	CED-NO	CED-NO	CED-NO	REQ	DDI-NO
0002	TEST MODULE NAME 02	2407	2408	2409					
0003	TEST MODULE NAME 03	2410	2411	2412	2413				
0004	TEST MODULE NAME 04	2414							
0005	TEST MODULE NAME 05	2415	2416	2417	2418	2419	2420	0003	
0006	TEST MODULE NAME 06	2421	2422						
0007	TEST MODULE NAME 07	2423							
0008	TEST MODULE NAME 08	2424						0002	
0009	TEST MODULE NAME 09	2425	2426					0003	
0010	TEST MODULE NAME 10	2430	2431	2432	2433			0008	
0011	TEST MODULE NAME 11	2434	2435					0006	
0012	TEST MODULE NAME 12	2436						0012	
0013	TEST MODULE NAME 13	2438	2439	2440				0014	
0014	TEST MODULE NAME 14	2441	2442						
0015	TEST MODULE NAME 15	2443							
0016	TEST MODULE NAME 16	2444						0002	
0017	TEST MODULE NAME 17	2446	2447	2448	2449	2450	2451	0002	
0018	TEST MODULE NAME 18	2452						0003	
0019	TEST MODULE NAME 19	2453						0019	
0020	TEST MODULE NAME 20	2454							
0021	TEST MODULE NAME 21	2455	2456						
0022	TEST MODULE NAME 22	2457	2458	2459					
0023	TEST MODULE NAME 23								
0024	TEST MODULE NAME 24								
0025	TEST MODULE NAME 25								

73.5.5.2

5.5.2.1 Punch File-PF

The Punch File-PF, a card deck which contains the created or updated Population File, is identical in appearance to the Audit File-PF with the exception that there are no trace or diagnostic messages or blank cards. Only cards with information content are punched by POPFM.

5.5.2.2 Punch File-S

The Punch File-S, a card deck which contains the generated JOVIAL source program, is identical in appearance to the Audit File-S with the exception that there are no trace or diagnostic messages or blank cards. Only cards with information content are punched by SJCVS.

5.5.2.3 Punch File-SP

The Punch File-SP, a card deck which contains the updated JOVIAL source program, is identical in appearance to the Audit File-SP with the exception that there are no trace or diagnostic messages or blank cards. Only cards with information content are punched by SOPMM.

5.5.2.4 Punch File-IP

The Punch File-IP, a card deck which contains the resequenced Population File, is identical in appearance to the Audit File-IP with the exception that there are no trace or diagnostic messages or blank cards. Only cards with information content are punched by INIPOP.

5.5.3 Magnetic Tape Output

5.5.3.1 Population File

A Population File is always generated by either of two programming modules, INIPOP and POPFM. The Population File is recorded on magnetic tape for subsequent processing.

5.5.3.2 Source Program File

A Source Program File is always generated by SJCVS. This file contains the generated JOVIAL test program and is submitted directly to the operating system for compilation and execution.

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APPENDIX 1

USAGE INSTRUCTIONS

Appendix 1 describes on the following pages usage instructions for each function on each computer. Usage instructions depict the status of the hardware configuration before the run (INPUT) and after the run (OUTPUT). All input/output considerations are fully described for both the INPUT stage and the OUTPUT stage. In addition, the exact form of an input card deck necessary to invoke the function is provided.

Each JCVS Usage Form contains the JCVS function to be performed, the computer, the operating philosophy and the program stage. All input/output functions and devices are specified over the six boxes on each form. On the top of each of these boxes is the logical system name associated with the input/output device.

For example, on the 6400 the logical tape designations are TAPE1, TAPE2, and TAPE3; the logical card input designation is INPUT, etc.

For those input/output units that are to be active for the current function, some indication of their participation is indicated. For those tape units that are to contain a switch tape for the subsequent processing, the word SCRATCH is placed at the bottom of the appropriate box; for those tape units that are to contain a JCVS input or output file, the file-name is placed in the bottom of the box; and for those tape units whose participation is not required, a N/A (not applicable) is placed at the bottom of the box.

In all cases, a job deck will be submitted through the card input unit which should be empty at the termination of the run. The printed output unit will always contain a standard form and standard carriage control tape and will contain the various audit files at the termination of a run. The card output unit will contain any punched output originating from any of the runs.

A complete description of the job deck structure required to process the function is given on each INPUT stage usage form. The (1) below the words JOB DECK STRUCTURE indicates column 1 of each card.

Logical Unit Names

The logical unit names for each computer will now be stated:

Configuration Units	CDC-6400	UNI-1108	GE-635	IBM 360-50
Card Input	INPUT	Card Reader Eighty	A1	SYS001
Card Output	PUNCH	Card Punch Eighty	A5	SYS003
Printed Output	OUTPUT	Printer	A2	SYS002
Tape Number 1	TAPE1	UNISERVO A	A3	SYS004
Tape Number 2	TAPE2	UNISERVO B	A4	SYS005
Tape Number 3	TAPE3	UNISERVO C	A6	SYS007

Special Cards

Certain configurations contain one or two special cards that act as end of record or end of file cards. The following table gives a list of these cards together with the characters that signify the EOR or EOF functions.

Configuration End	CDC-6400	UNI-1108	GE-635	IBM 360-50
EOR	7,8,9 punch Column 1	No Entry	\$bbbbbbENDJOB	No Entry
EOF	6,7,8,9 punch Column 1	@bFIN Column 1-5	***EOF	1*

JCVS USAGE FORM

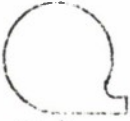


Function: POPFM 1

Computer: CDC - 6400

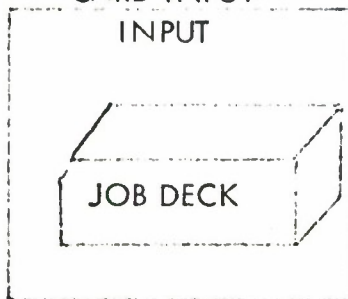
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

TAPE 1	TAPE 2	TAPE 3
		
N/A	SCRATCH	N/A

CARD INPUT INPUT



PRINTED OUTPUT OUTPUT

Standard Form	Standard Carriage Control Tape
------------------	---

CARD OUTPUT PUNCH

CARD PUNCH READY

JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA

JOB, 93007, 10, 10, 35000. POPFM 1 CG

REQUEST, TAPE 2, HI. (ASSIGN/RING)

REWIND (TAPE 2)

COBOL (LXRM).

LGO.

(End of Record Card)

(CCBOL Source Program Deck POPFM

(End of Record Card)

(Control Card - PF)

(Current File - PF Deck)

(End of File Card)

JCVS USAGE FORM




Function: POPFM 1

Computer: CDC - 6400

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

TAPE 1	TAPE 2	TAPE 3
		
N/A	New Population File	N/A


CARD INPUT

INPUT CARD READER EMPTY
--

PRINTED OUTPUT

OUT	PUT
 AUDIT FILE-PF (Optional)	Standard Carriage Control Tape

CARD OUTPUT

PUNCH
 PUNCH FILE-PF (Optional)

JCVS USAGE FORM




Function: POPFM 1

Computer: CDC - 6400


Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

TAPES

TAPE 1	TAPE 2	TAPE 3
		
N/A	SCRATCH	N/A

CARD INPUT INPUT



JOB DECK

PRINTED OUTPUT OUTPUT

Standard Form	Standard Carriage Control Tape
------------------	---

CARD OUTPUT PUNCH

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA

JOB, 93007, 10, 10, 35000. POPFM 1 LG

REQUEST, TAPE 2, HI. (ASSIGN/RING)

REWIND (TAPE 2)

LOAD (INPUT)

EXECUTE (POPFM)

(End of Record Card)

(Binary Program Deck - POPFM)

(End of Record Card)

(Control Card - PF)

(Current File - PF Deck)

(End of File Card)

JCVS USAGE FORM


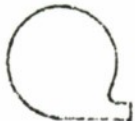

Function: POPFM 1

Computer: CDC - 6400

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

TAPE 1	TAPE 2	TAPE 3
		
N/A	New Population File	N/A


CARD INPUT

INPUT CARD READER EMPTY

PRINTED OUTPUT

OUTPUT	
 AUDIT FILE-PF (Optional)	Standard Carriage Control Tape

CARD OUTPUT

PUNCH
 PUNCH FILE-PF (Optional)

JCVS USAGE FORM




Function: POPFM 2

Computer: CDC - 6400

Operating Philosophy: Compile Source Program and Go

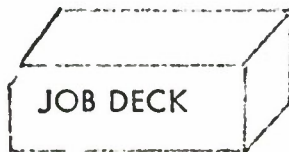
Stage: INPUT

TAPES

TAPE 1	TAPE 2	TAPE 3
		
Old Population File	SCRATCH	N/A

CARD INPUT

INPUT



PRINTED OUTPUT

OUTPUT

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

PUNCH

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA

JOB, 93007, 10, 10, 35000. POPFM 2 CG

REQUEST, TAPE 1, HI. (REEL/NO RING)

REQUEST, TAPE 2, HI. (ASSIGN/RING)

REWIND (TAPE 1).

REWIND (TAPE 2).

COBOL (LXRN).

LGO

(End of Record Card)

(COBOL Source Program Deck - POPFM)

(End of Record Card)

(Control Card - PF)

(Current File - PF Deck)

(End of File Card)

JCVS USAGE FORM

Function: POPFM 2

Computer: CDC - 6400

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

TAPE 1	TAPE 2	TAPE 3
		
Old Population File	New Population File	N/A


CARD INPUT

INPUT CARD READER EMPTY

PRINTED OUTPUT

OUTPUT
<div>  <p>AUDIT FILE-PF (Optional)</p> </div> <div> <p>Standard Carriage Control Tape</p> </div>

CARD OUTPUT

PUNCH
<div>  <p>PUNCH FILE-PF (Optional)</p> </div>

JCVS USAGE FORM

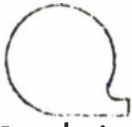


Function: POPFM 2

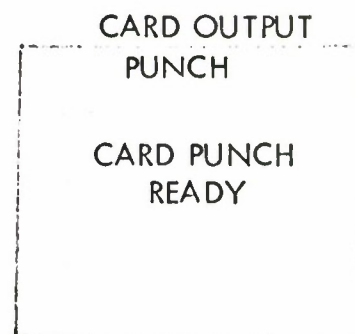
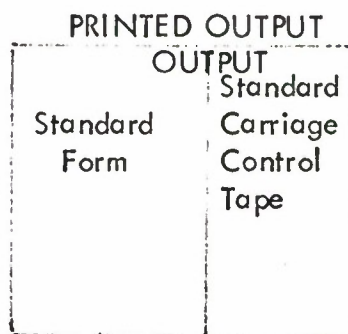
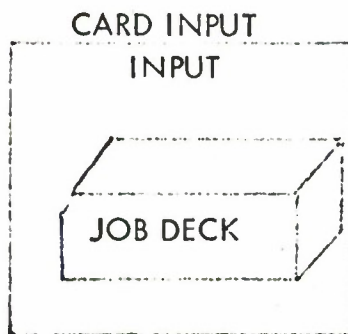
Computer: CDC - 6400

Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

TAPES

TAPE 1	TAPE 2	TAPE 3
		
Old Population File	SCRATCH	N/A



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA

JOB, 93007, 10, 10, 35000. POPFM 2 LG

REQUEST, TAPE 1, HI. (REEL/NO RING)

REQUEST, TAPE 2, HI. (ASSIGN/RING)

REWIND (TAPE 2).

LOAD (INPUT)

EXECUTE (POPFM)

(End of Record Card)

(Binary Program Deck - POPFM)

(End of Record Card)

(Control Card - PF)

(Current File - PF Deck)

(End of File Card)

JCVS USAGE FORM

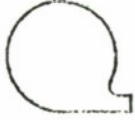


Function: POPFM 2

Computer: CDC - 6400

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT

TAPES

TAPE 1	TAPE 2	TAPE 3
		
Old Population File	New Population File	N/A


CARD INPUT

INPUT CARD READER EMPTY

PRINTED OUTPUT

OUTPUT	
<table border="1"> <tr> <td>AUDIT FILE-PF (Optional)</td> </tr> </table>	AUDIT FILE-PF (Optional)
AUDIT FILE-PF (Optional)	
Standard Carriage Control Tape	

CARD OUTPUT

PUNCH

PUNCH FILE-PF (Optional)

JCVS USAGE FORM

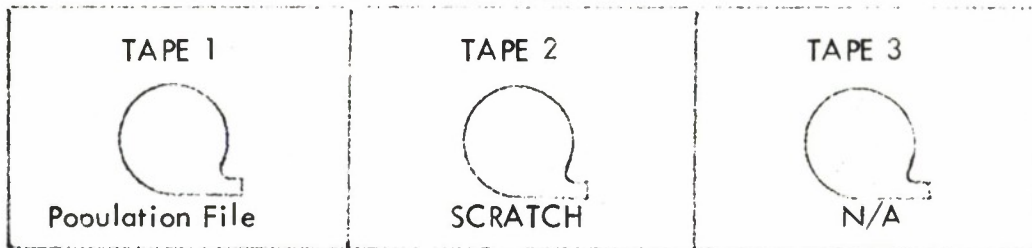
Function: SELECT

Computer: CDC - 6400

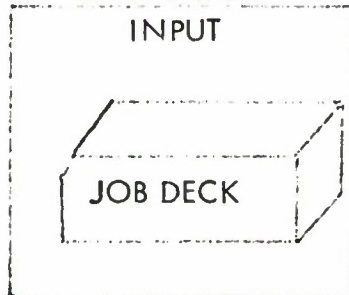
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

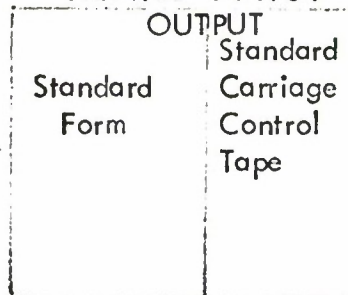
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA

JOB, 93007, 10, 10, 35000. SELECT

REQUEST, TAPE 1, HI. (REEL/NO RING)

REQUEST, TAPE 2, HI. (ASSIGN/RING)

REWIND (TAPE 2).

COBOL (LXRM).

LGO.

(End of Record Card)

(COBOL Source Program Deck - SJCVS)

(End of Record Card)

(Control Card - S)

(Test Selection. File Deck)

(End of File Card)

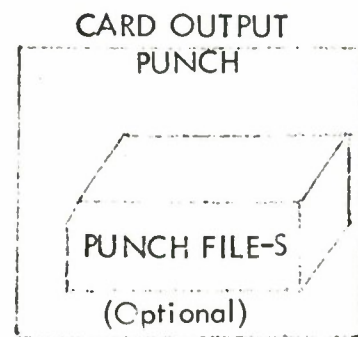
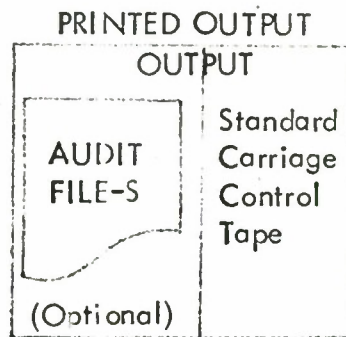
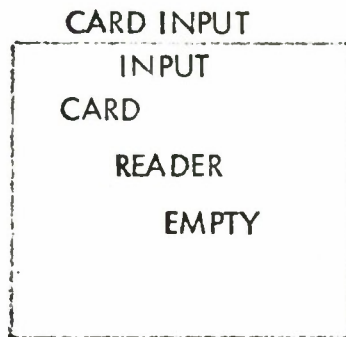
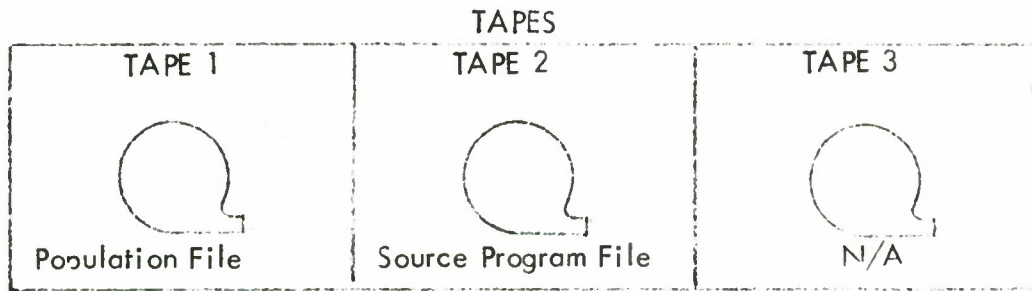
JCVS USAGE FORM

Function: SELECT

Computer: CDC - 6400

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT



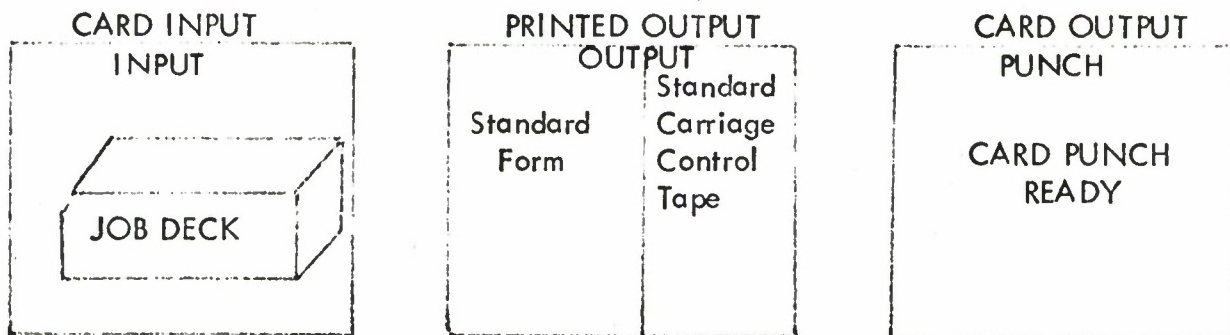
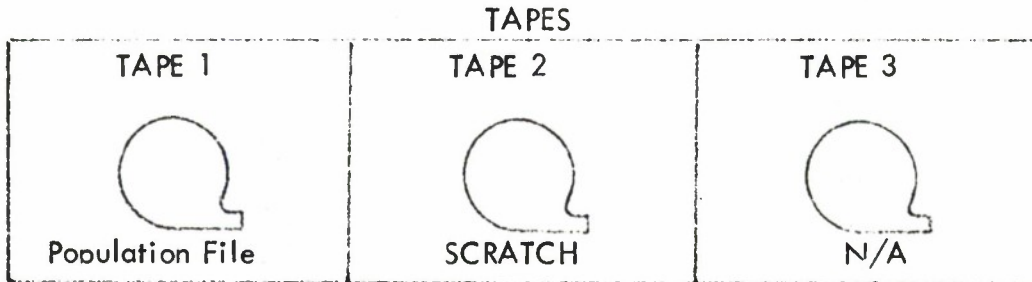
JCVS USAGE FORM

Function: SELECT

Computer: CDC - 6400

Operating Philosophy: Load Binary Deck and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA

JOB, 93007, 10, 10, 35000. SELECT

REQUEST, TAPE 1, HI. (REEL/NO RING)

REQUEST, TAPE 2, HI. (ASSIGN/RING)

REWIND, (TAPE 2).

LOAD (INPUT)

EXECUTE (SJCVS)

(End of Record Card)

(Binary Program Deck - SJCVS)

(End of Record Card)

(Control Card - S)

(Test Selection File Deck)

(End of File Card)

JCVS USAGE FORM




Function: SELECT

Computer: CDC - 6400

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT

TAPES

TAPE 1	TAPE 2	TAPE 3
		
Population File	Source Program File	N/A

CARD INPUT

INPUT

CARD

READER

EMPTY

PRINTED OUTPUT

OUTPUT

AUDIT
FILE-S

(Optional)

Standard
Carriage
Control
Tape

CARD OUTPUT

PUNCH

PUNCH FILE-S

(Optional)

JCVS USAGE FORM


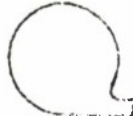

Function: SOPMM

Computer: CDC - 6400

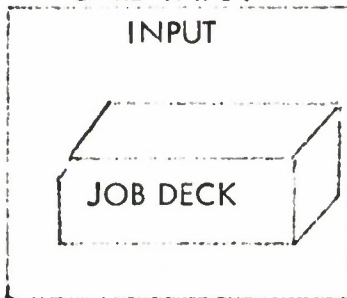
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

TAPE 1	TAPE 2	TAPE 3
		
Old Source Program File	SCRATCH	N/A

CARD INPUT INPUT



PRINTED OUTPUT OUTPUT

Standard Form	Standard Carriage Control Tape
------------------	---

CARD OUTPUT PUNCH

CARD PUNCH READY

JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000. SOPMM

REQUEST, TAPE 1, HI. (REEL/NO RING)

REQUEST, TAPE 2, HI. (ASSIGN/RING)

REWIND (TAPE 2).

COBOL (LXRM).

LGO.

(End of Record Card)

(COBOL Source Program Deck - SOPMM)

(End of Record Card)

(Control Card - SP)

(Current File - SP Deck)

(End of File Card)

JCVS USAGE FORM


Function: SOPMM

Computer: CDC - 6400

Operating Philosophy: Compoile Source Program and Go

Stage: OUTPUT


TAPES

TAPE 1	TAPE 2	TAPE 3
		
Old Source Program File	New Source Program File	N/A


CARD INPUT

INPUT CARD READER EMPTY
--

PRINTED OUTPUT

OUTPUT	
 AUDIT FILE-SP (Optional)	Standard Carriage Control Tape

CARD OUTPUT

PUNCH
 PUNCH FILE-SP (Optional)

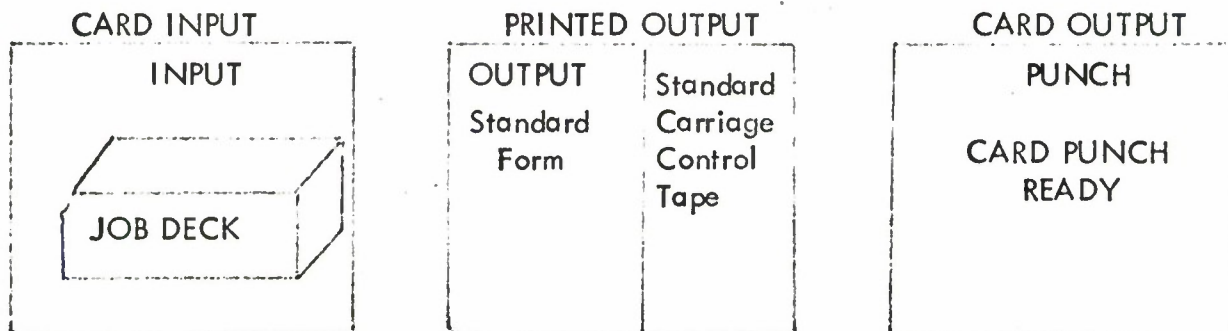
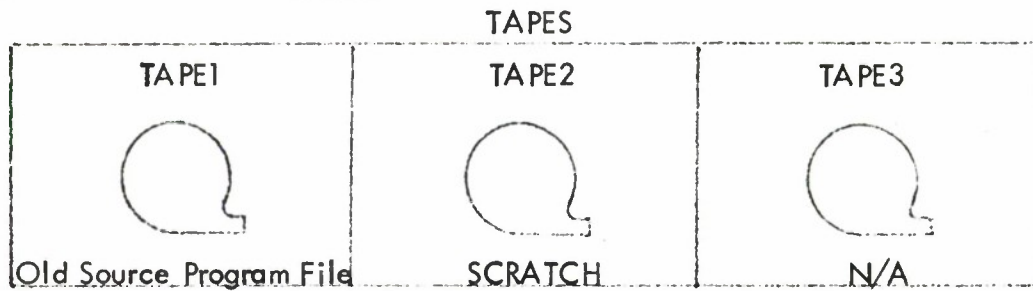
JCVS USAGE FORM

Function: SOPMM

Computer: CDC-6400

Operating Philosophy: Load Binary Deck and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000. SOPMM

REQUEST, TAPE1, HI. (REEL/NORING)

REQUEST, TAPE2, HI. (ASSIGN/RING)

REWIND (TAPE2)

LOAD (INPUT)

EXECUTE (SOPMM)

(End of Record Card)

(Binary Program Deck-SOPMM)

(End of Record Card)

(Control Card-SP)

(Current File-SP Deck)

(End of File Card)

JCVS USAGE FORM

Function: SOPMM

Computer: CDC-6400

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

TAPE1	TAPE2	TAPE3
		
Old Source Program File	New Source Program File	N/A


CARD INPUT

INPUT CARD READER EMPTY

PRINTED OUTPUT

OUTPUT	
AUDIT FILE-SP 	Standard Carriage Control Tape

CARD OUTPUT

PUNCH
 PUNCH FILE-SP

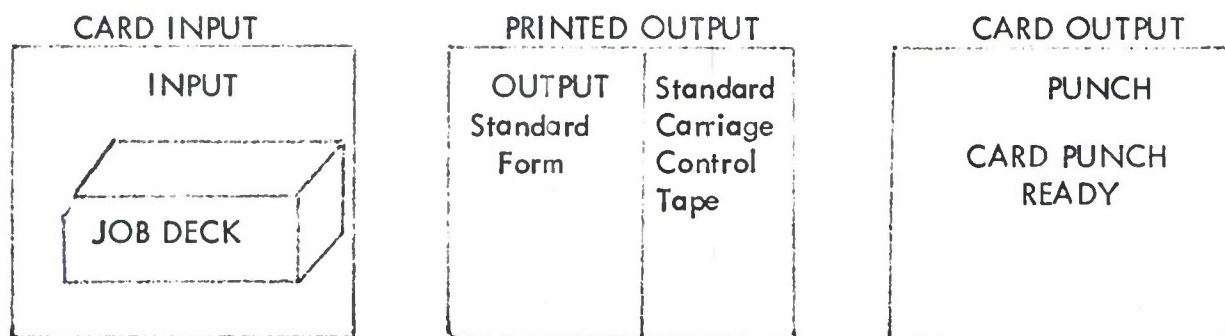
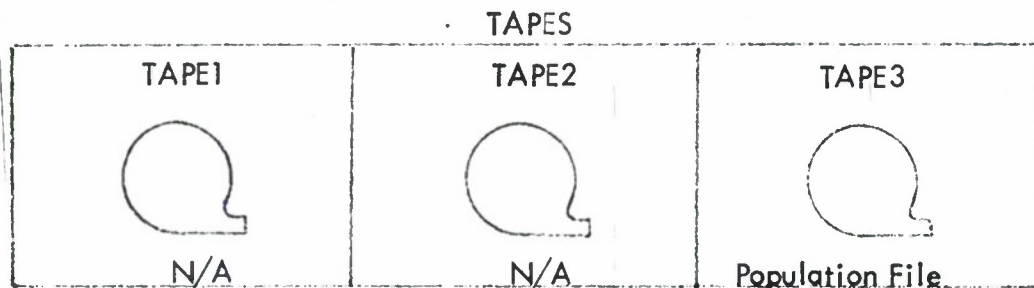
JCVS USAGE FORM

Function: JCVSRP

Computer: CDC-6400

Operating Philosophy: Compile Source Program and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000. JCVSRP.

REQUEST, TAPE3, HI. (XXXX/NORING)

XXXX = Population File Reel Number

COBOL (LXRM).

LGO.

(End of Record Card)

(COBOL Source Program Deck - JCVSRP)

(End of Record Card)

(Control Card-RP)

(End of File Card)

JCVS USAGE FORM

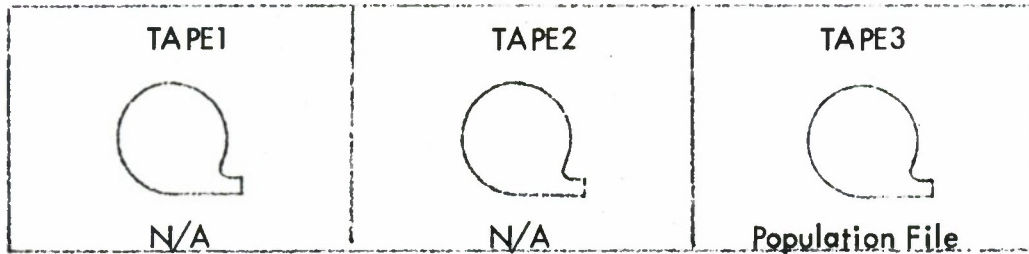
Function: JCVSRP

Computer: CDC-6400

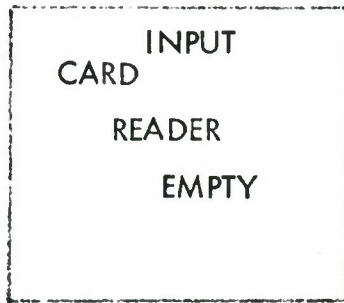
Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT

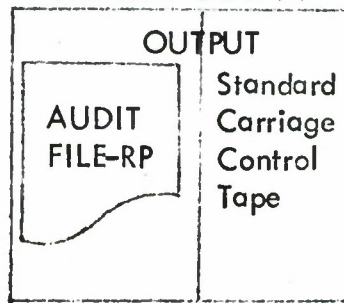
TAPES



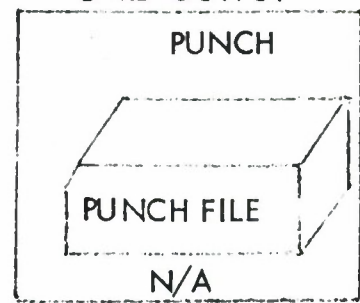
CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



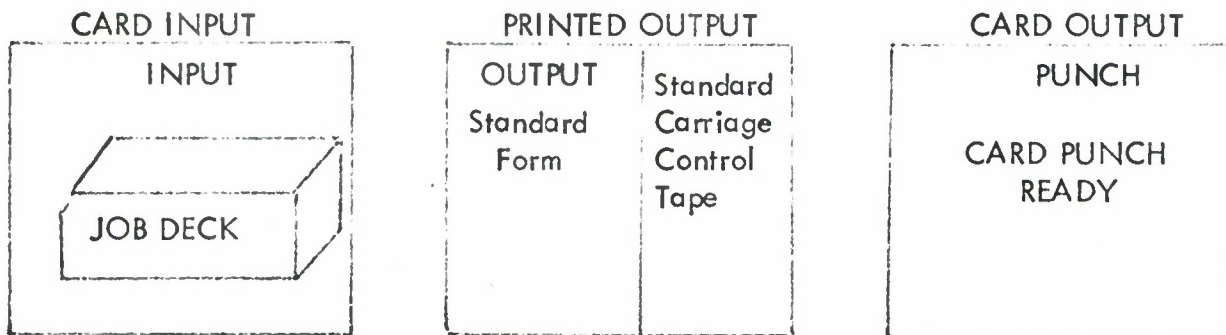
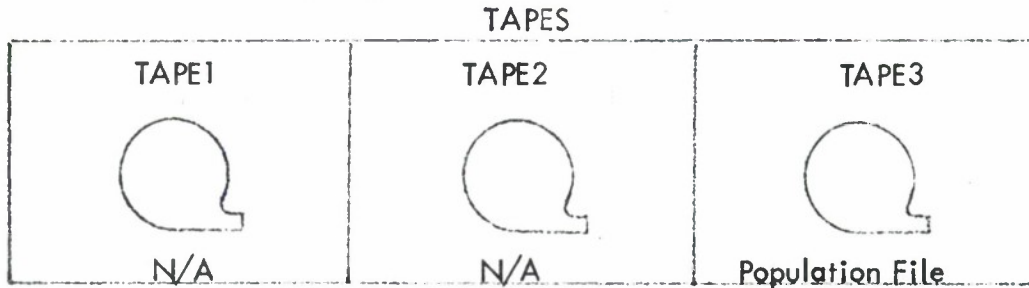
JCVS USAGE FORM

Function: JCVSRP

Computer: CDC-6400

Operating Philosophy: Load Binary Deck and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000.

REQUEST, TAPE3, HI. (XXXX/NORING)

XXXX = Population File Reel Number

LOAD (INPUT)

EXECUTE (JCVSRP)

(End of Record Card)
 (Binary Program Deck - JCVSRP)
 (End of Record Card)
 (Control Card - RP)
 (End of File Card)

JCVS USAGE FORM


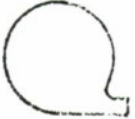

Function: JCVSRP

Computer: CDC-6400

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

TAPE1	TAPE2	TAPE3
		
N/A	N/A	Population File


CARD INPUT

<p>INPUT CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

OUTPUT	
<p>AUDIT FILE-RP</p> 	<p>Standard Carriage Control Tape</p>

CARD OUTPUT

PUNCH
 <p>PUNCH FILE</p> <p>N/A</p>

JCVS USAGE FORM

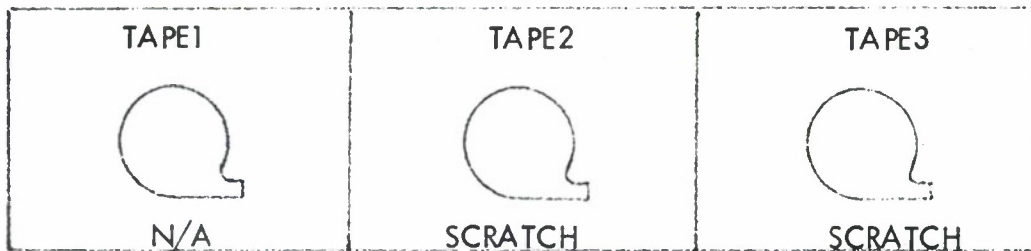
Function: INIPOPI

Computer: CDC-6400

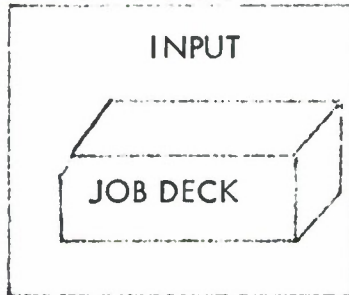
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

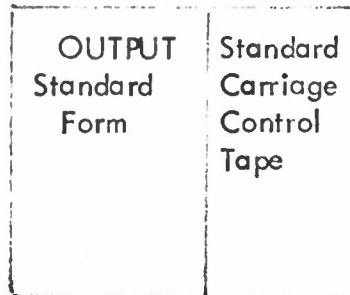
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000. INIPOPI.

COBOL (LXRM).

LGO.

(End of Record Card)
 (COBOL Source Program Deck - INIPOP)
 (End of Record Card)
 (Control Card - IP)
 (Current File - PF Deck)
 (End of File Card)

JCVS USAGE FORM

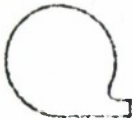

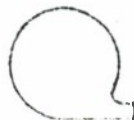
Function: INIPOP1

Computer: CDC-6400

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

TAPE 1	TAPE 2	TAPE 3
		
N/A	Population File	SCRATCH


CARD INPUT

INPUT CARD READER EMPTY

PRINTED OUTPUT

OUTPUT	
AUDIT FILE-IP 	Standard Carriage Control Tape

CARD OUTPUT

PUNCH
 PUNCH FILE-IP

JCVS USAGE FORM

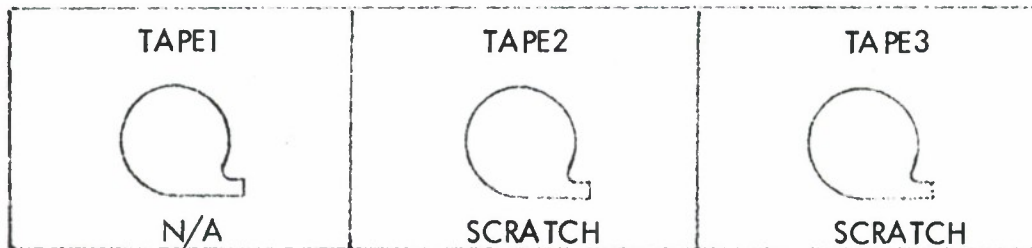
Function: INIPOP1

Computer: CDC-6400

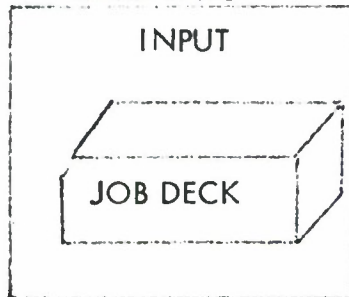
Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

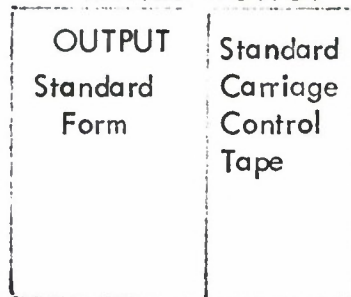
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000.

LOAD (INPUT)

EXECUTE (INIPOP)




(End of Record Card)
 (Binary Program Deck - INIPOP)
 (End of Record Card)
 (Control Card-IP)
 (Current File-PF Deck)
 (End of File Card)

JCVS USAGE FORM

Function: INIPOP1
Computer: CDC-6400

Operating Philosophy: Load Binary Deck and Go
Stage: OUTPUT


TAPES

TAPE1	TAPE2	TAPE3
		
N/A	Population File	SCRATCH


CARD INPUT

<p>INPUT CARD READER EMPTY</p>
--

PRINTED OUTPUT

OUTPUT	
<p>AUDIT FILE-IP</p> 	<p>Standard Carriage Control Tape</p>

CARD OUTPUT

PUNCH
 <p>PUNCH FILE-IP</p>

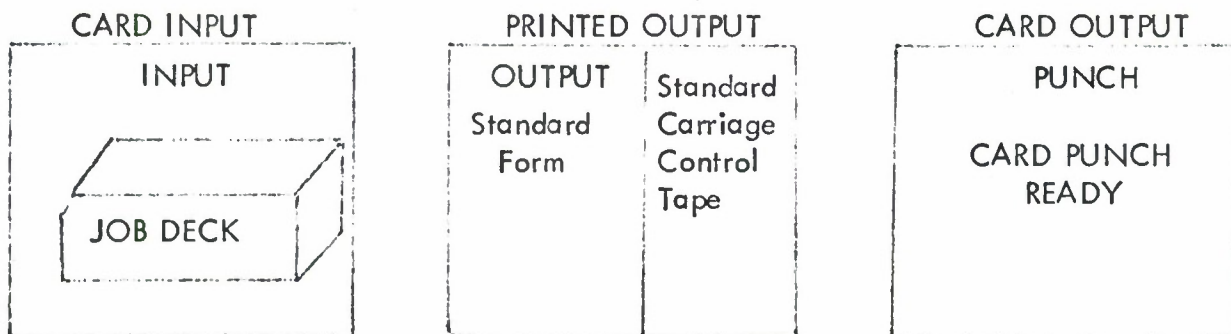
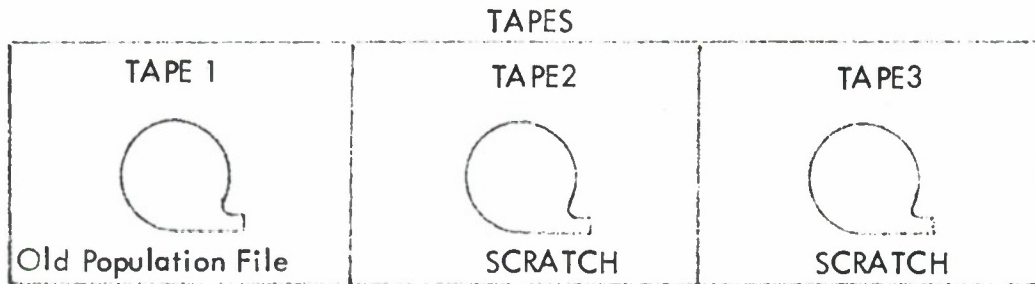
JCVS USAGE FORM

Function: INIPOP2

Computer: CDC-6400

Operating Philosophy: Compile Source Program and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000. INIPOP2.

REQUEST, TAPE1, HI. (XXXX/NORING)

XXXX = Population File Reel Number

COBOL (LXRM).

LGO.

(End of Record Card)

(COBOL Source Program Deck - INIPOP)

(End of Record Card)

(Control Card-IP)

(End of File Card)

JCVS USAGE FORM

Function: INIPOP2

Computer: CDC-6400

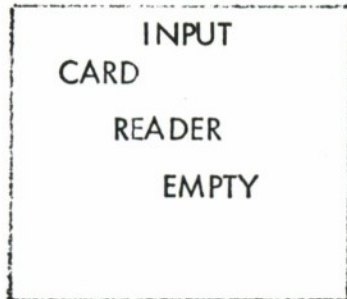
Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT

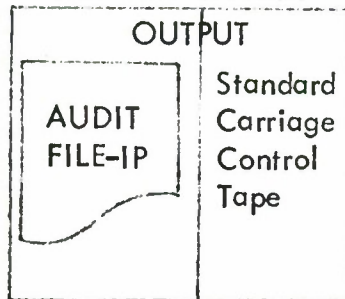
TAPES



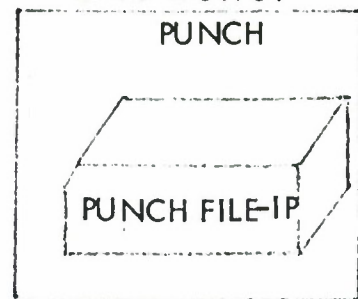
CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JCVS USAGE FORM

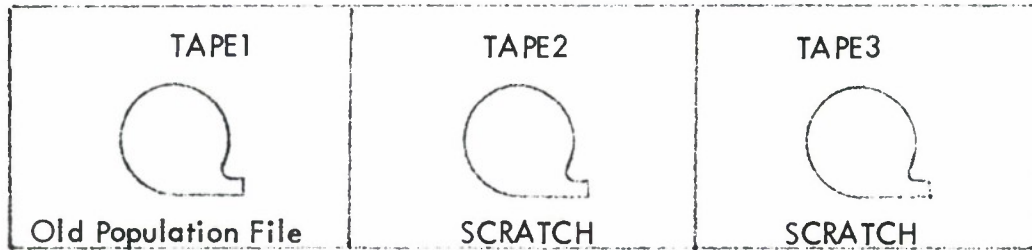
Function: INIPOP2

Computer: CDC-6400

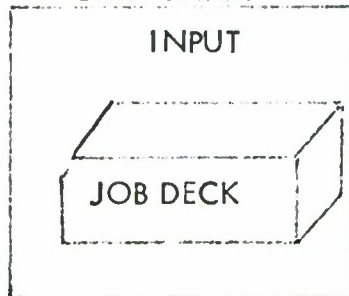
Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

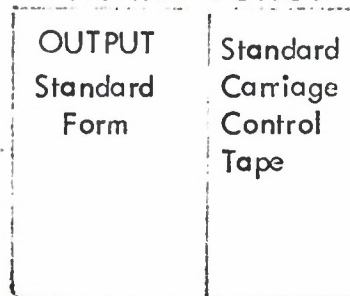
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)

SEQUENCE, 14156, SMA.

JOB, 93007, 10, 10, 35000. INIPOP2.

REQUEST, TAPE1, HI. (XXXX/NORING)

XXXX = Population File Reel Number

LOAD (INPUT)

EXECUTE (INIPOP)

(End of Record Card)

(Binary Program Deck - INIPOP)

(End of Record Card)

(Control Card-IP)

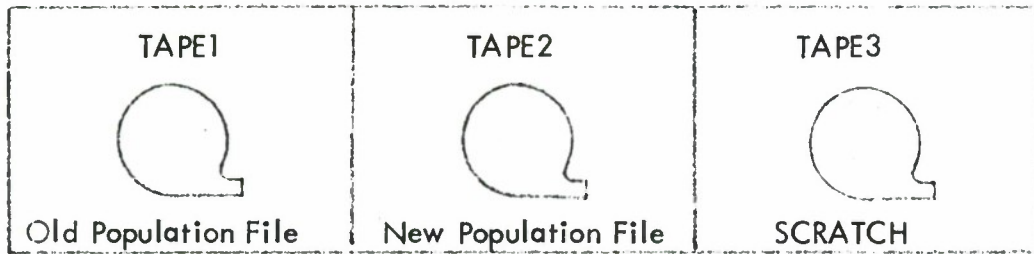
(End of File Card)

JCVS USAGE FORM

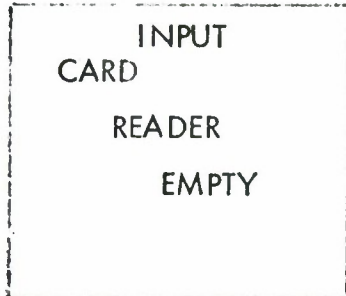
Function: INIPOP2
Computer: CDC-6400

Operating Philosophy: Load Binary Deck and Go
Stage: OUTPUT

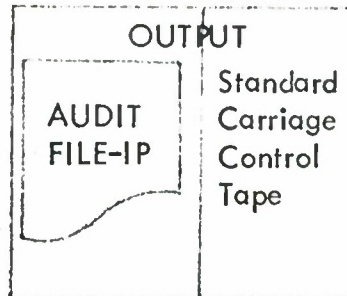
TAPES



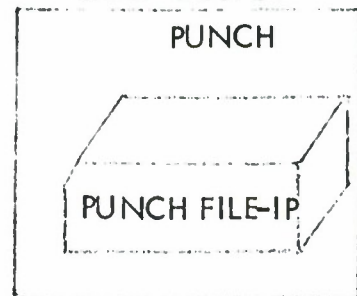
CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JCVS USAGE FORM




Function: POPFM1

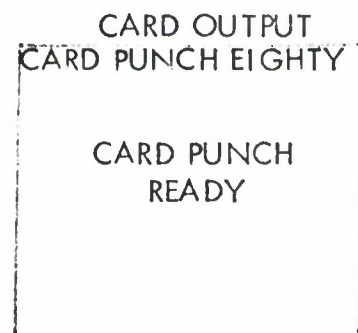
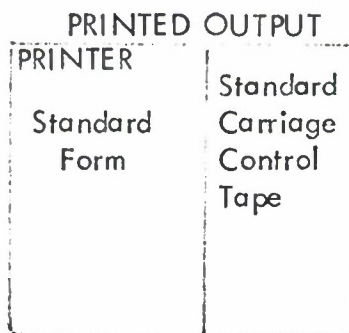
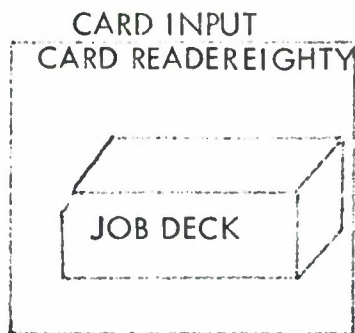
Computer: UNIVAC - 1108

Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
N/A	SCRATCH	N/A



JOB DECK STRUCTURE

(1)

@ RUN 1 POPFM1, DDCG, 5, 300

@ ASG B = SAVE

@ BREI COB POPFM1

(COBOL Source Program Deck - POPFM)

@ XQT POPFM1

(Control Card - PF)

(Current File - PF Deck)

@ FIN

JCVS USAGE FORM


Function: POPFMI

Computer: UNIVAC - 1108

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

<p>UNISERVO A</p>  <p>N/A</p>	<p>UNISERVO B</p>  <p>New Population File</p>	<p>UNISERVO C</p>  <p>N/A</p>
--	--	--

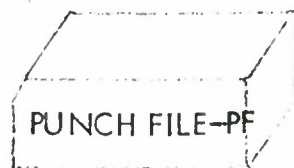
CARD INPUT

<p>CARD READER EIGHTY CARD</p> <p>READER EMPTY</p>
--

PRINTED OUTPUT

<p>PRINTER</p> <div> <p>AUDIT FILE-PF</p>  </div> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
--	---




CARD OUTPUT

<p>CARD PUNCH EIGHTY</p> <div>  <p>PUNCH FILE-PF</p> </div> <p>(Optional)</p>
--

JCVS USAGE FORM

Function: POPFM1
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: INPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
N/A	SCRATCH	N/A

CARD INPUT

CARD READER EIGHTY



PRINTED OUTPUT

PRINTER

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

CARD PUNCH EIGHTY

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)

@ RUN 1 POPFM1, DOLG, 5, 300

@ ASG B = SAVE

(Binary Program Deck - POPFM)

@ XQT, POPFM1

(Control Card - PF)

(Current File - PF Deck)

@ FIN



JCVS USAGE FORM

Function: POPFM1
 Computer: UNIVAC - 1108

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
N/A	New Population File	N/A


CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

PRINTER	
 AUDIT FILE-PF	Standard Carriage Control Tape
(Optional)	




CARD OUTPUT

CARD PUNCH EIGHTY  PUNCH FILE-PF (Optional)
--

JCVS USAGE FORM

Function: POPFM2
 Computer: UNIVAC -1108
 Operating Philosophy: Compile Source Program and Go
 Stage: INPUT

TAPES

UNISERVO A  Old Population File	UNISERVO B  SCRATCH	UNISERVO C  N/A
--	--	--

CARD INPUT

CARD READER EIGHTY



PRINTED OUTPUT

PRINTER

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

CARD PUNCH EIGHTY

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)

@ RUN 1 POPFM2,DDLG,5,300

@ ASG,B,A = XXXX

XXXX = POPFILE1 reel number

@ BREI COB POPFM2

(COBOL Source Program Deck - POPFM)

@ XQT POPFM2

(Control Card - PF)

(Current File - PF Deck)

@ FIN

JCVS USAGE FORM




Function: POPFM2

Computer: UNIVAC - 1108

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Old Population File	New Population File	N/A


CARD INPUT

<p>CARD READER EIGHTY CARD</p> <p>READER EMPTY</p>
--

PRINTED OUTPUT

PRINTER	
<p>AUDIT FILE-PF</p> 	<p>Standard Carriage Control Tape</p>
(Optional)	




CARD OUTPUT

<p>CARD PUNCH EIGHTY</p> 
(Optional)

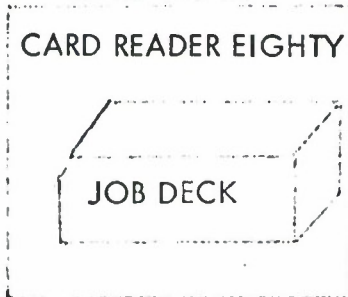
JCVS USAGE FORM

Function: POPFM2
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: INPUT

TAPES

UNISERVO A  Old Population File	UNISERVO B  SCRATCH	UNISERVO C  N/A
--	--	---

CARD INPUT



PRINTED OUTPUT

PRINTER Standard Form	Standard Carriage Control Tape
-----------------------------	---

CARD OUTPUT

CARD PUNCH EIGHTY CARD PUNCH READY
--

JOB DECK STRUCTURE

(1)

@ RUN 1 POPFM2,DDLG,5,300

XXXX = POPFILE1 reel number

@ ASG B A = XXXX

(Binary Program Deck - POPFM)

@ XQT POPFM2

(Control Card - PF)

(Current File - PF Deck)

@ FIN

JCVS USAGE FORM




Function: POPFM2

Computer: UNIVAC - 1108

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Old Population File	New Population File	N/A


CARD INPUT

<p>CARD READER EIGHTY CARD</p> <p>READER EMPTY</p>
--

PRINTED OUTPUT

PRINTER	
 <p>AUDIT FILE-PF</p> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>

CARD OUTPUT

<p>CARD PUNCH EIGHTY</p>  <p>PUNCH FILE-PF</p> <p>(Optional)</p>

JCVS USAGE FORM




Function: SELECT

Computer: UNIVAC - 1108

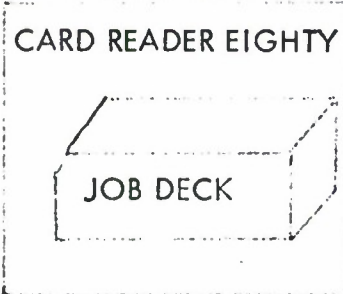
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Population File	SCRATCH	N/A

CARD INPUT



PRINTED OUTPUT

PRINTER	
Standard Form	Standard Carriage Control Tape

CARD OUTPUT

CARD PUNCH EIGHTY
CARD PUNCH READY

JOB DECK STRUCTURE

(1)

@ RUN 1 SELECT,DDCG,5,300

@ ASG A = XXXX,B = YYYY

@ BREI COB SELECT

XXXX = POPFILE1 reel number

YYYY = JOVSP reel number

(COBOL Source Program Deck - SELECT)

@ XQT SELECT

(Control Card - S)

(Test Selection File Deck)

@ FIN

JCVS USAGE FORM

Function: SELECT
 Computer: UNIVAC - 1108
 Operating Philosophy: Compile Source Program and Go
 Stage: OUTPUT


TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Population File	Source Program File	N/A


CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

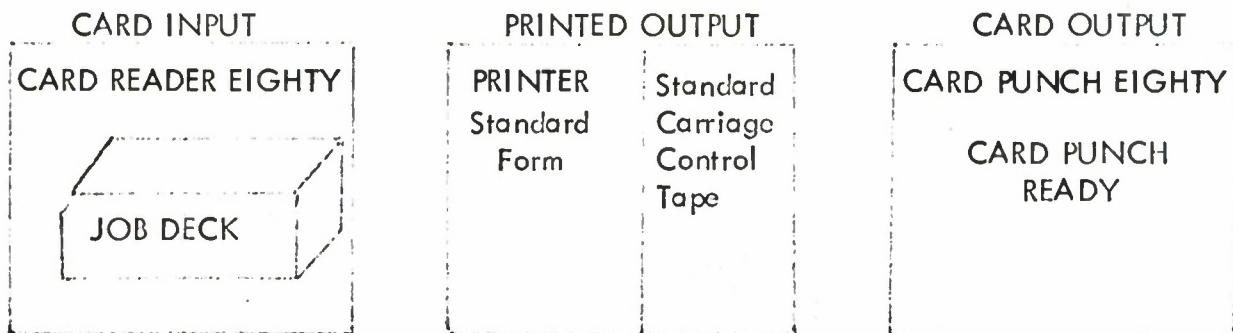
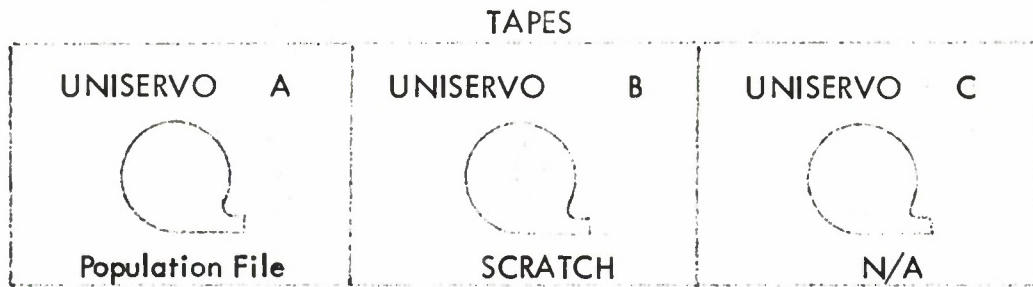
PRINTER  (Optional)	Standard Carriage Control Tape
--	---

CARD OUTPUT

CARD PUNCH EIGHTY  (Optional)
--

JCVS USAGE FORM

Function: SELECT
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: INPUT



JOB DECK STRUCTURE

(1)

@ RUN SELECT,DDLG,5,300
 @ ASG A = XXXX B = YYYY

XXXX = POPFILE1 reel number
 YYYY = JOVSP reel number

(Binary Program Deck - Select)

@ XQT SELECT




(Control Card - S)
 (Test Selection File Deck)

@ FIN

JCVS USAGE FORM

Function: SELECT
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: OUTPUT


TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Population File	Source Program File	N/A


CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

PRINTER	
 AUDIT FILE-S (Optional)	Standard Carriage Control Tape




CARD OUTPUT

CARD PUNCH EIGHTY  PUNCH FILE-S (Optional)
--

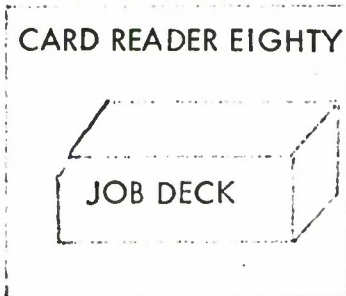
JCVS USAGE FORM

Function: SOPMM
 Computer: UNIVAC - 1108
 Operating Philosophy: Compile Source Program and Go
 Stage: INPUT

TAPES

UNISERVO A  Old Source Program File	UNISERVO B  SCRATCH	UNISERVO C  N/A
--	--	---

CARD INPUT



PRINTED OUTPUT

PRINTER Standard Form	Standard Carriage Control Tape
-----------------------------	---

CARD OUTPUT

CARD PUNCH EIGHTY CARD PUNCH READY
--

JOB DECK STRUCTURE

(1)

@ RUN SOPMM,DDLG,5,300
 @ ASG A = XXXX,B
 @ BREI COB SOPMM

XXXX = JOVSP reel number

(COBOL Source Program Deck - SOPMM)

@ XQT SOPMM

(Control Card - SP)
 (Current File - SP Deck)

@ FIN

JCVS USAGE FORM

Function: SOPMM
 Computer: UNIVAC - 1108
 Operating Philosophy: Compile Source Program and Go
 Stage: OUTPUT


TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Old Source Program File	New Source Program File	N/A

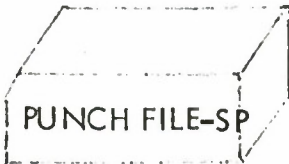
CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

PRINTER	
	Standard Carriage Control Tape
(Optional)	




CARD OUTPUT

CARD PUNCH EIGHTY

(Optional)

JCVS USAGE FORM

Function: SOPMM
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: INPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Old Source Program File	SCRATCH	N/A

CARD INPUT

CARD READER EIGHTY



JOB DECK

PRINTED OUTPUT

PRINTER

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

CARD PUNCH EIGHTY

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)

@ RUN SOPMM, DDLG,5,300
 @ ASG A = XXXX,B

XXXX = JOVSP reel number

(Binary Program Deck - SOPMM)

@ XQT SOPMM



(Control Card - SP)
 (Current File - SP Deck)

@ FIN

JCVS USAGE FORM

Function: SOPMM
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: OUTPUT


TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Old Source Program File	New Source Program File	N/A


CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

PRINTER	
 (Optional)	Standard Carriage Control Tape

CARD OUTPUT

CARD PUNCH EIGHTY  (Optional)

JCVS USAGE FORM




Function: JCVSRP

Computer: UNIVAC - 1108

Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

UNISERVO A  N/A	UNISERVO B  N/A	UNISERVO C  Population File
--	--	--

CARD INPUT

CARD READER EIGHTY



PRINTED OUTPUT

PRINTER

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

CARD PUNCH EIGHTY

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)

@ RUN 1 JCVSRP,DDCG,5,300

@ ASG C = XXXX

@ BREI COB JCVSRP

XXXX = POPFILE1 reel number

(COBOL Source Program Deck - JCVSRP)

@ XQT JCVSRP

(Control Card - RP)

@ FIN

JCVS USAGE FORM




Function: JCVSRP

Computer: UNIVAC - 1108

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

UNISERVO A  N/A	UNISERVO B  N/A	UNISERVO C  Population File Reports
--	--	--


CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

PRINTER	
AUDIT FILE-RP 	Standard Carriage Control Tape

CARD OUTPUT

CARD PUNCH EIGHTY  PUNCH FILE-RP N/A
--

JCVS USAGE FORM




Function: JCVSRP

Computer: UNIVAC - 1108

Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

TAPES

UNISERVO A  N/A	UNISERVO B  N/A	UNISERVO C  Population File
--	--	---

CARD INPUT



PRINTED OUTPUT

PRINTER Standard Form	Standard Carriage Control Tape
-----------------------------	---

CARD OUTPUT

CARD PUNCH EIGHTY CARD PUNCH READY
--

JOB DECK STRUCTURE

(1)

@ RUN 1 JCVSRP,DDLG,5,300

@ ASG C = XXXX

XXXXXX = POPFILE1 reel number

(Binary Program Deck - JCVSRP)

@ XQT JCVSRP

(Control Card - IP)




@ FIN

JCVS USAGE FORM

Function: JCVSRP
Computer: UNIVAC - 1108

Operating Philosophy: Load Binary Deck and Go
Stage: OUTPUT


TAPES

UNISERVO A  N/A	UNISERVO B  N/A	UNISERVO C  Population File
--	--	--


CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

PRINTER	
AUDIT FILE-RP 	Standard Carriage Control Tape

CARD OUTPUT

CARD PUNCH EIGHTY  PUNCH FILE N/A

JCVS USAGE FORM




Function: INIPOP

Computer: UNIVAC - 1108

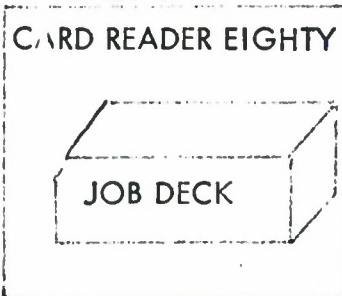
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
N/A	SCRATCH	SCRATCH

CARD INPUT



PRINTED OUTPUT

PRINTER	
Standard Form	Standard Carriage Control Tape

CARD OUTPUT

CARD PUNCH EIGHTY
CARD PUNCH READY

JOB DECK STRUCTURE

(1)

@ RUN 1 INIPOP,DDICG,5,300

@ ASG B,C

@ BREI COB INIPOP

(COBOL Source Program Deck - INIPOP)

@ XQT INIPOP

(Control Card - IP)

(Current File - PF Deck)

@ FIN

JCVS USAGE FORM


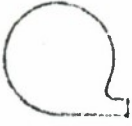

Function: INIPOPI

Computer: UNIVAC - 1108

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

UNISERVO A  N/A	UNISERVO B  Population File	UNISERVO C  SCRATCH
--	--	--


CARD INPUT

CARD READER EIGHTY CARD READER EMPTY

PRINTED OUTPUT

PRINTER	
AUDIT FILE-IP 	Standard Carriage Control Tape
(Optional)	




CARD OUTPUT

CARD PUNCH EIGHTY
 PUNCH FILE-IP
(Optional)

JCVS USAGE FORM

Function: INIPOP
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: INPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
N/A	SCRATCH	SCRATCH

CARD INPUT

CARD READER EIGHTY



PRINTED OUTPUT

PRINTER
 Standard
 Form

Standard
 Carriage
 Control
 Tape

CARD OUTPUT

CARD PUNCH EIGHTY

CARD PUNCH
 READY

JOB DECK STRUCTURE

(1)

@ RUN 1 INIPOP,DDTLG,5,300

@ ASG B,C

(Binary Program Deck - INIPOP)

@ XQT INIPOP

(Control Card - IP)

(Current File - PF Deck)

@ FIN

JCVS USAGE FORM




Function: INIPOI

Computer: UNIVAC - 1108

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

UNISERVO A  N/A	UNISERVO B  Population File	UNISERVO C  SCRATCH
--	--	--


CARD INPUT

CARD READER EIGHTY
CARD
READER
EMPTY

PRINTED OUTPUT

PRINTER	
AUDIT FILE-IP 	Standard Carriage Control Tape
(Optional)	

CARD OUTPUT

CARD PUNCH EIGHTY  PUNCH FILE-IP (Optional)
--

JCVS USAGE FORM

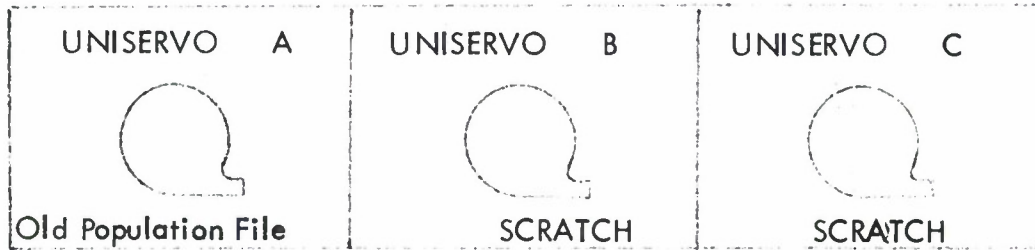
Function: INIPOP2

Computer: UNIVAC - 1108

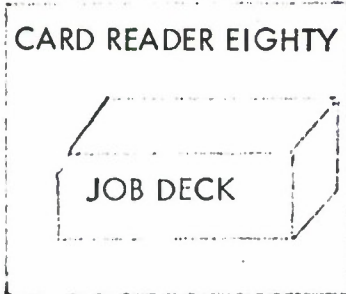
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

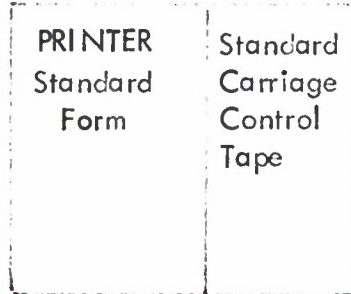
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)

@ RUN 1 INIPOP,DD2CG,5,300

@ ASG A = XXXX,B,C

@ BREI COB INIPOP

XXXX = POPFILE1 reel number

(COBOL Source Program Deck - INIPOP)

@ XQT INIPOP

(Control Card - IP)

@ FIN

JCVS USAGE FORM




Function: INIPOP2

Computer: UNIVAC - 1108

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Old Population File	New Population File	SCRATCH

CARD INPUT

CARD READER EIGHTY CARD
READER
EMPTY

PRINTED OUTPUT

PRINTER
AUDIT FILE-IP
(Optional)
Standard Carriage Control Tape




CARD OUTPUT

CARD PUNCH EIGHTY
PUNCH FILE-IP
(Optional)

JCVS USAGE FORM

Function: INIPOP2
 Computer: UNIVAC - 1108
 Operating Philosophy: Load Binary Deck and Go
 Stage: INPUT

TAPES

UNISERVO A	UNISERVO B	UNISERVO C
		
Old Population File	SCRATCH	SCRATCH

CARD INPUT

CARD READER EIGHTY



PRINTED OUTPUT

PRINTER

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

CARD PUNCH EIGHTY

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)

@ RUN 1 INIPOP,DD2LG,5,300

@ ASG A = XXXX,B,C

XXXX = POPFILE1 reel number

(Binary Program Deck INIPOP)

@ XQT INIPOP

(Control Card - 1P)

@ FIN

JCVS USAGE FORM



Function: INIPOP2

Computer: UNIVAC - 1108

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

<p>UNISERVO A</p>  <p>Old Population File</p>	<p>UNISERVO B</p>  <p>New Population File</p>	<p>UNISERVO C</p>  <p>SCRATCH</p>
--	--	--


CARD INPUT

<p>CARD READER EIGHTY CARD</p> <p>READER EMPTY</p>
--

PRINTED OUTPUT

<p>PRINTER</p>  <p>AUDIT FILE-IP</p> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>CARD PUNCH EIGHTY</p>  <p>PUNCH FILE-IP</p> <p>(Optional)</p>
--

JCVS USAGE FORM




Function: POPFM1

Computer: GE-635


Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

A3  SCRATCH	A4  N/A	A6  N/A
--	--	---

CARD INPUT

A1  JOB DECK

PRINTED OUTPUT

A2 Standard Form	Standard Carriage Control Tape
------------------------	---

CARD OUTPUT

A5 CARD PUNCH READY

JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	COBOL	
\$	INCODE	IBMC

(COBOL Source Program Deck - POPFM)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S,,POPFILE1,,SAVE
\$	SYSOUT	A5
\$	DATA	A1

(Control Card - PF)

(Current File - PF Deck)

\$
***EOF

ENDJOB

JCVS USAGE FORM

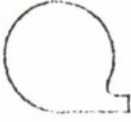


Function: POPFM1

Computer: GE-635

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

<p>A3</p>  <p>New Population File</p>	<p>A4</p>  <p>N/A</p>	<p>A6</p>  <p>N/A</p>
--	--	--


CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p>  <p>AUDIT FILE-PF</p> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
--	---

CARD OUTPUT

<p>A5</p>  <p>PUNCH FILE-PF</p> <p>(Optional)</p>
--

JCVS USAGE FORM

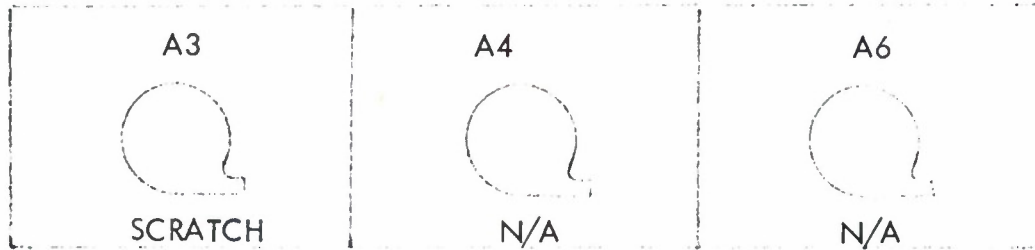
Function: POPFM1

Computer: GE-635

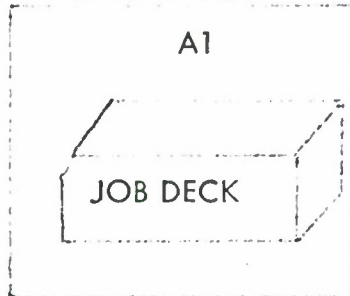
Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

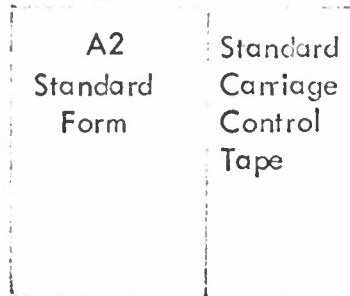
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	OPTION	COBOL

(Binary Program Deck - POPFM)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S,,POPF1E1,,XXXX
\$	SYSOUT	A5
\$	DATA	A1

XXXX = reel number

(Control Card - PF)
(Current File - PF Deck)

\$
***EOF

ENDJOB

JCVS USAGE FORM




Function: POPFM1

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT

TAPES

<p>A3</p>  <p>New Population File</p>	<p>A4</p>  <p>N/A</p>	<p>A6</p>  <p>N/A</p>
--	--	--

CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p> <div data-bbox="577 783 739 969" style="border: 1px solid black; padding: 5px;"> <p>AUDIT FILE-PF</p> </div> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
--	---

CARD OUTPUT

<p>A5</p> <div data-bbox="1054 818 1339 984" style="border: 1px solid black; padding: 5px;"> <p>PUNCH FILE-PF</p> </div> <p>(Optional)</p>
--

JCVS USAGE FORM

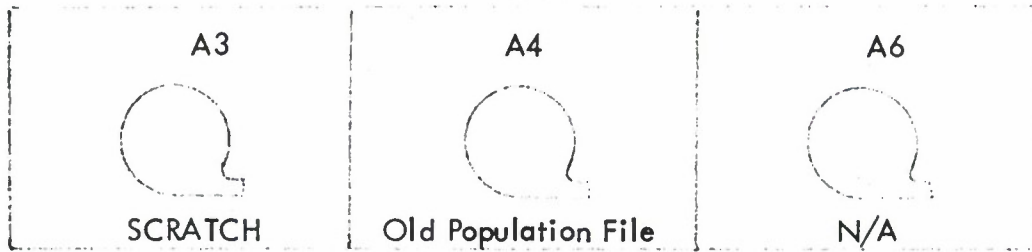
Function: POPFM2

Computer: GE-635

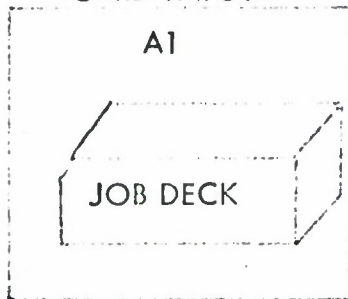
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

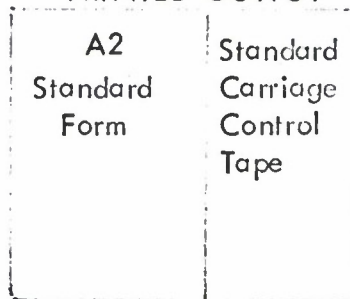
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	COBOL	
\$	INCODE	IBMC

(COBOL Source Program Deck - POPFM)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4D POPFILE1,,XXXX
\$	SYSOUT	A5
\$	DATA	A1

XXXX = reel number

(Control Card - PF)
(Current File - PF Deck)

\$
***EOF

ENDJOB

JCVS USAGE FORM




Function: POPFM2

Computer: GE-635

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

<p>A3</p>  <p>New Population File</p>	<p>A4</p>  <p>Old Population File</p>	<p>A6</p>  <p>N/A</p>
--	--	--


CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p>  <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---------------------------------------

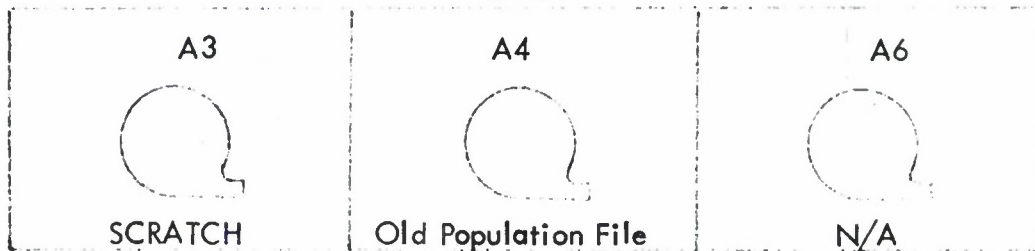
CARD OUTPUT

<p>A5</p>  <p>(Optional)</p>

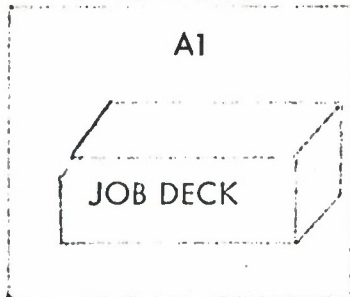
JCVS USAGE FORM

Function: POPFM2
 Computer: GE-635
 Operating Philosophy: Load Binary Deck and Go
 Stage: INPUT

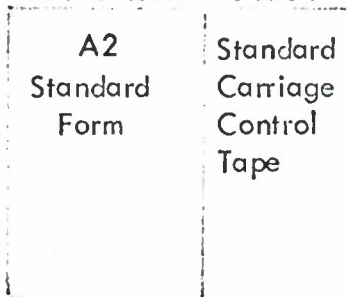
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	OPTION	COBOL

(Binary Program Deck - POPFM)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4D,, POPFILE1,,XXXX
\$	SYSOUT	A5
\$	DATA	A1

XXXX=reel number

(Control Card - PF)
 (Current File - PF Deck)

\$
 ***EOF

ENDJOB

JCVS USAGE FORM

Function: POPFM2

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

<p>A3</p>  <p>New Population File</p>	<p>A4</p>  <p>Old Population File</p>	<p>A6</p>  <p>N/A</p>
--	--	--


CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p> <div> <p>AUDIT FILE-PF</p>  </div> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>A5</p> <div>  <p>PUNCH FILE-PF</p> </div> <p>(Optional)</p>

JCVS USAGE FORM




Function: SELECT

Computer: GE-635

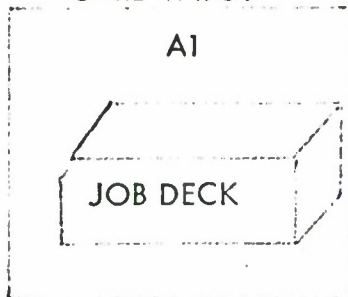
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

A3  SCRATCH	A4  Population File	A6  N/A
--	--	---

CARD INPUT



PRINTED OUTPUT

A2 Standard Form	Standard Carriage Control Tape
------------------------	---

CARD OUTPUT

A5 CARD PUNCH READY

JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	COBOL	
\$	INCODE	IBMC

(COBOL Source Program Deck - SJCVS)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	TAPE	A3,X3S,,SAVE,,JOVSP
\$	SYSOUT	A5
\$	SYSOUT	A2
\$	DATA	A1

(Control Card - S)
(Test Selection File Deck)

\$
***EOF

ENDJOB

JCVS USAGE FORM

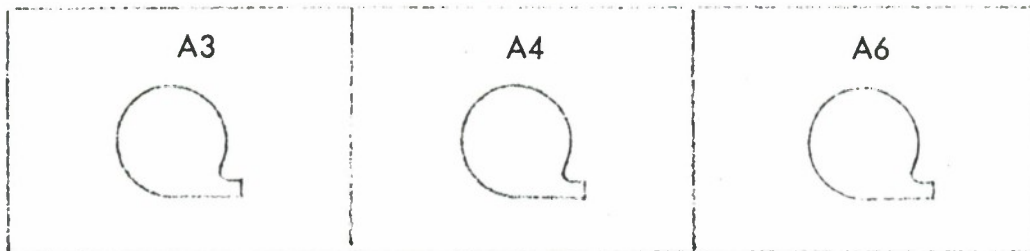
Function: SELECT

Computer: GE-635

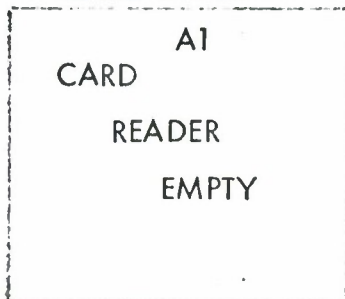
Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT

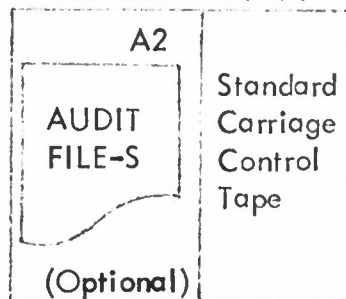
TAPES



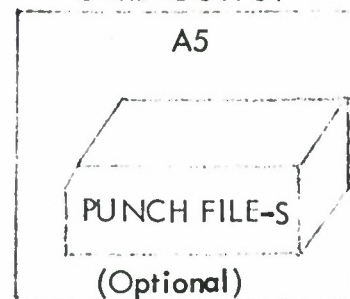
CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JCVS USAGE FORM

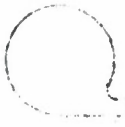


Function: SELECT

Computer: GE-635

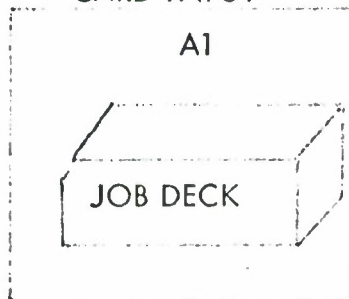
Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

TAPES

A3  SCRATCH	A4  Population File	A6  N/A
--	--	---

CARD INPUT



PRINTED OUTPUT

A2 Standard Form	Standard Carriage Control Tape
------------------------	---

CARD OUTPUT

A5 CARD PUNCH READY

JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	OPTION	COBOL

(Binary Program Deck - SJCVS)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	TAPE	A3,X3S,,SAVE,,JOVSP
\$	SYSOUT	A5
\$	SYSOUT	A2
\$	DATA	A1

(Control Card - S)
(Test Selection File Deck)

\$ ENDJOB
***EOF

JCVS USAGE FORM




Function: SELECT

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT

TAPES

A3	A4	A6
		
Source Program File	Population File	N/A

CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p> <p>AUDIT FILE-S</p> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>A5</p> <p>PUNCH FILE-S</p> <p>(Optional)</p>

JCVS USAGE FORM

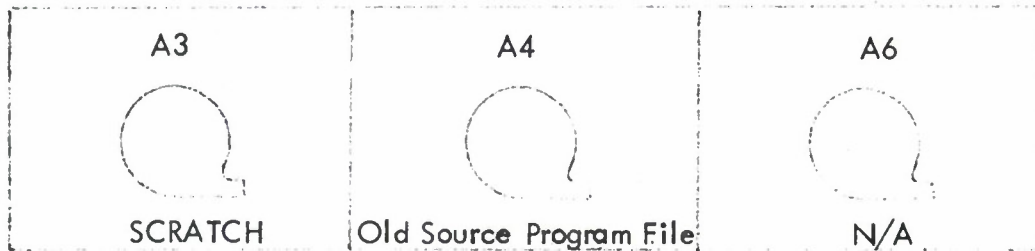
Function: SOPMM

Computer: GE-635

Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES



CARD INPUT

A1



PRINTED OUTPUT

A2

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

A5

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	COBOL	
\$	INCODE	IBMC

(COBOL Source Program Deck - SOPMM)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4S,,JOVSP,,XXXX
\$	SYSOUT	A5
\$	DATA	A1

XXXX = reel number

(Control Card - SP)

(Current File - SP - Deck)

\$ ENDJOB

***EOF

JCVS USAGE FORM




Function: SOPMM

Computer: GE-635

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

<p>A3</p>  <p>New Source Pgm File</p>	<p>A4</p>  <p>Old Source Pgm File</p>	<p>A6</p>  <p>N/A</p>
--	--	--

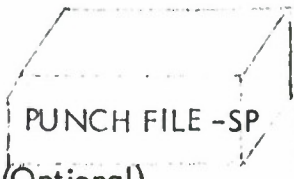
CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p>  <p>AUDIT FILE -SP</p> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>A5</p>  <p>PUNCH FILE -SP</p> <p>(Optional)</p>
--

JCVS USAGE FORM

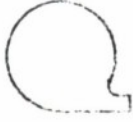


Function: SOPMM

Computer: GE-635

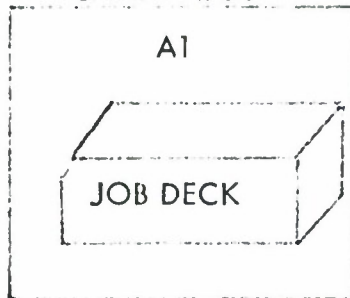
Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

TAPES

A3  SCRATCH	A4  Old Source Program File	A6  N/A
--	--	---

CARD INPUT



PRINTED OUTPUT

A2 Standard Form	Standard Carriage Control Tape
------------------------	---

CARD OUTPUT

A5 CARD PUNCH READY

JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	OPTION	COBOL

(Binary Program Deck - SOPMM)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4S,,JOVSP,,XXXX
\$	SYSOUT	A5
\$	DATA	A1

XXXX = reel number

(Control Card - SP)
(Current File - SP Deck)

\$
***EOF

ENDJOB

JCVS USAGE FORM




Function: SOPMM

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

<p>A3</p>  <p>New Source Pgm File</p>	<p>A4</p>  <p>Old Source Pgm File</p>	<p>A6</p>  <p>N/A</p>
--	--	--


CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p>  <p>AUDIT FILE-SP</p> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
--	---

CARD OUTPUT

<p>A5</p>  <p>PUNCH FILE-SP</p> <p>(Optional)</p>
--

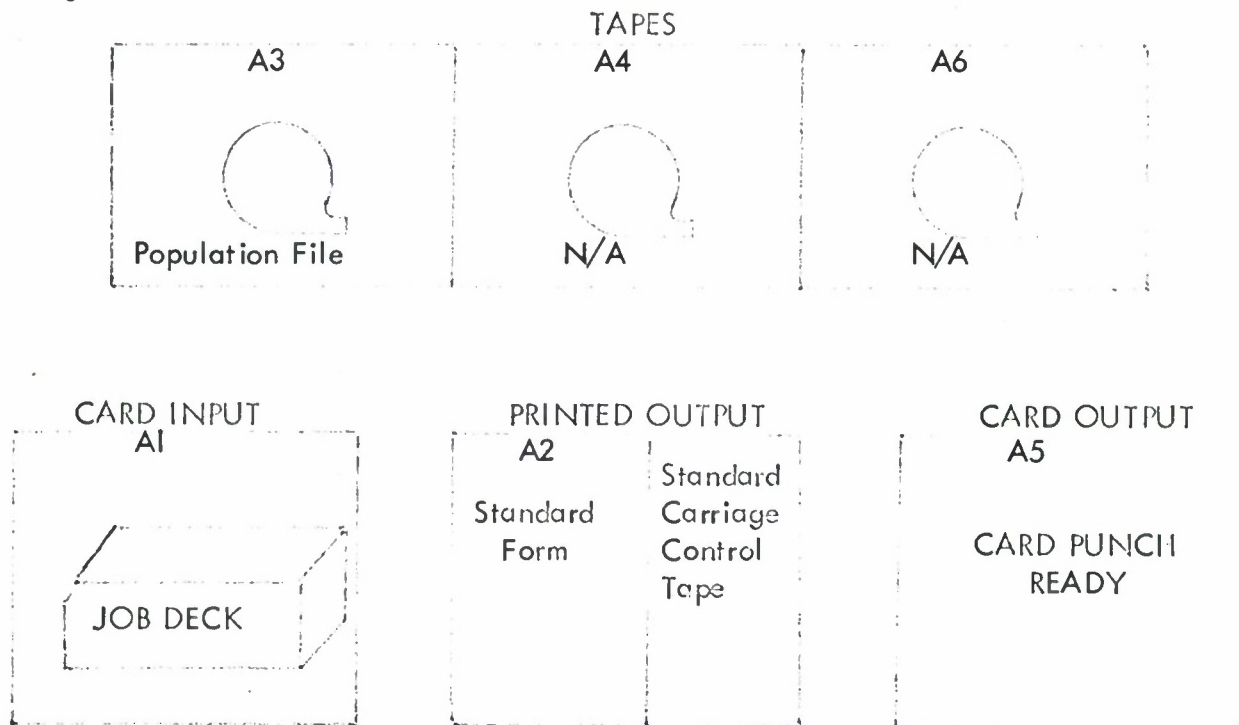
JCVS USAGE FORM

Function: JCVSRP

Computer: GE-635

Operating Philosophy: Compile Source Program and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203, DATDY
\$	COBOL	
\$	INCODE	IBMC

(COBOL Source Program Deck - JCVSRP)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3, X3D,, POPFILE1,, XXXX
\$	DATA	A1

XXXX = reel number

(Control Card - RP)

\$ ENDJOB
***EOF

JCVS USAGE FORM




Function: JCVSRP

Computer: GE-635

Operating Philosophy: Compile Source Program Deck and Go

Stage: OUTPUT


TAPES

A3	A4	A6
		
Population File	N/A	N/A


CARD INPUT

AI
CARD
READER
EMPTY

PRINTED OUTPUT

A2	
	Standard Carriage Control Tape
AUDIT FILE -RP	

CARD OUTPUT

A5

PUNCH FILE
N/A

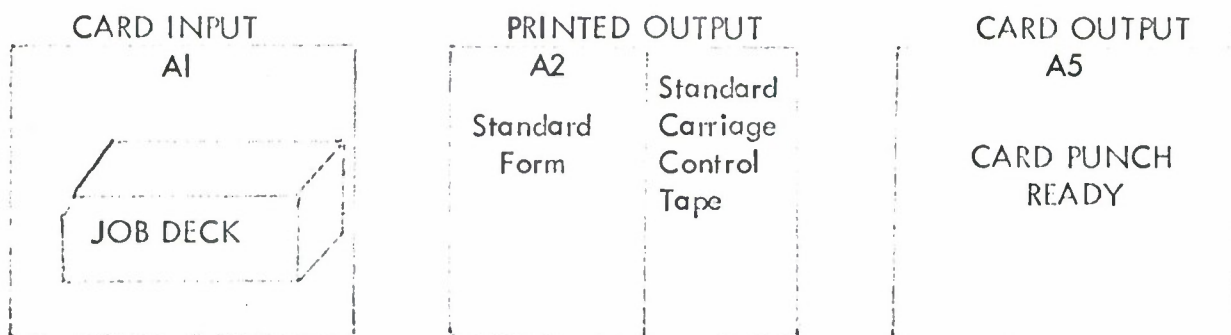
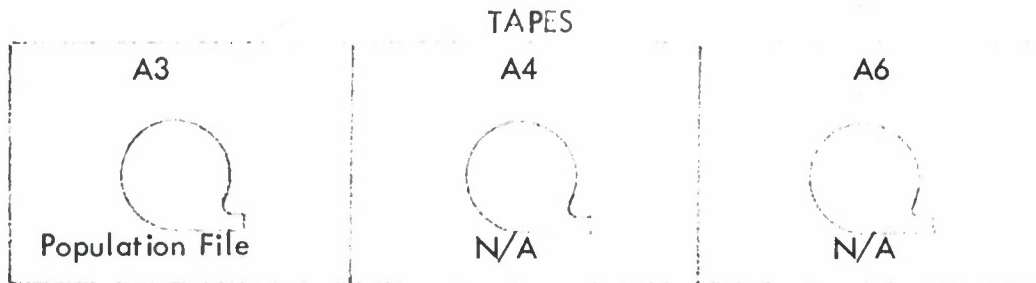
JCVS USAGE FORM

Function: JCVSRP

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	OPTION	COBOL
	(Binary Program Deck - JCVSRP)	
\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3D,,POPFIL1,,XXXX
\$	DATA	A1

XXXX = reel number

(Control Card - RP)

\$
***EOF

ENDJOB

JCVS USAGE FORM




Function: JCVSRP

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT


TAPES

<p>A3</p>  <p>Population File</p>	<p>A4</p>  <p>N/A</p>	<p>A6</p>  <p>N/A</p>
--	--	--


CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>A2</p>  <p>AUDIT FILE-RP</p>	<p>Standard Carriage Control Tape</p>
--	---

CARD OUTPUT

<p>A5</p>  <p>PUNCH FILE</p> <p>N/A</p>

JCVS USAGE FORM

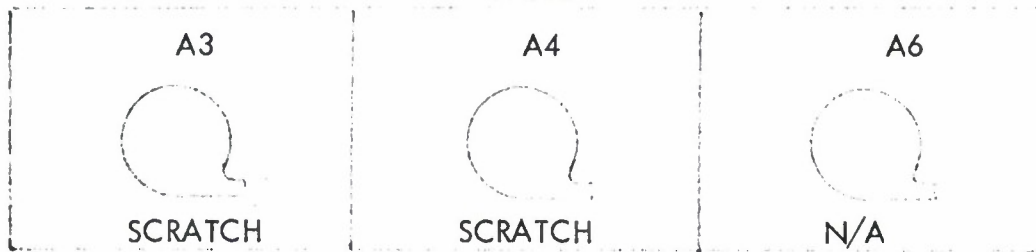
Function: INIPOP1

Computer: GE-635

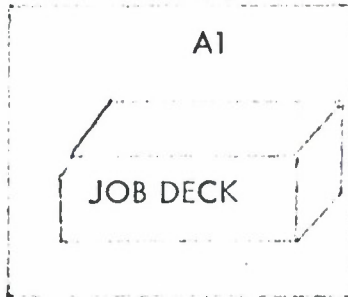
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

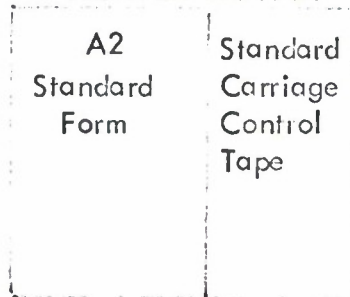
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	COBOL	
\$	INCODE IBMC	

(COBOL Source Program Deck - INIPOP)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4R
\$	SYSOUT	A5
\$	DATA	A1

(Control Card - IP)

(Current File- PF Deck)

\$	ENDJOB
***EOF	

JCVS USAGE FORM


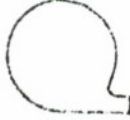

Function: INIPOP1

Computer: GE-635

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

A3	A4	A6
		
Population File	SCRATCH	N/A


CARD INPUT

AI
CARD
READER
EMPTY

PRINTED OUTPUT

A2	
	Standard Carriage Control Tape
(Optional)	

CARD OUTPUT

A5

(Optional)

JCVS USAGE FORM

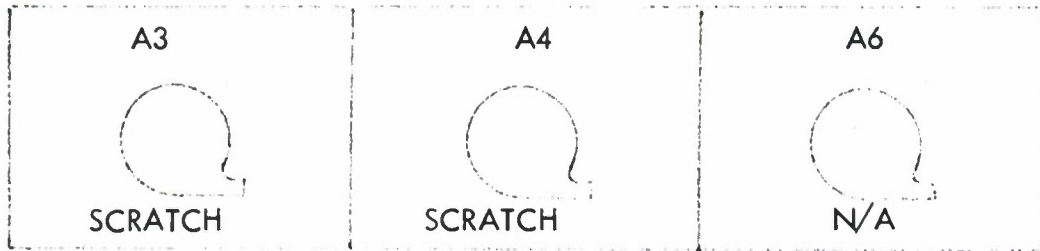
Function: INIPOP1

Computer: GE-635

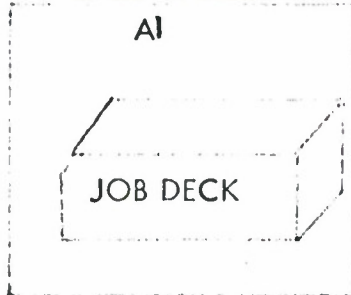
Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

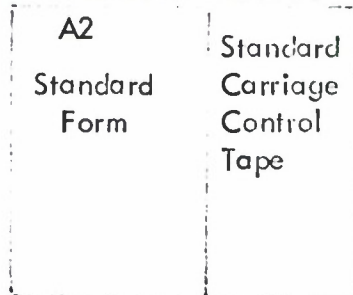
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203, DATDY
\$	OPTION	COBOL

(Binary Program Deck - INIPOP)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4R
\$	SYSOUT	A5
\$	DATA	A1

(Control Card - IP)

(Current File - PF Deck)

\$ ENDJOB
***EOF

JCVS USAGE FORM




Function: INIPOP1

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT

TAPES

A3	A4	A6
		
Population File	SCRATCH	N/A

CARD INPUT

<p>A1</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

A2	
<p>AUDIT FILE-IP</p> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>

CARD OUTPUT

A5
<p>PUNCH FILE-IP</p> <p>(Optional)</p>

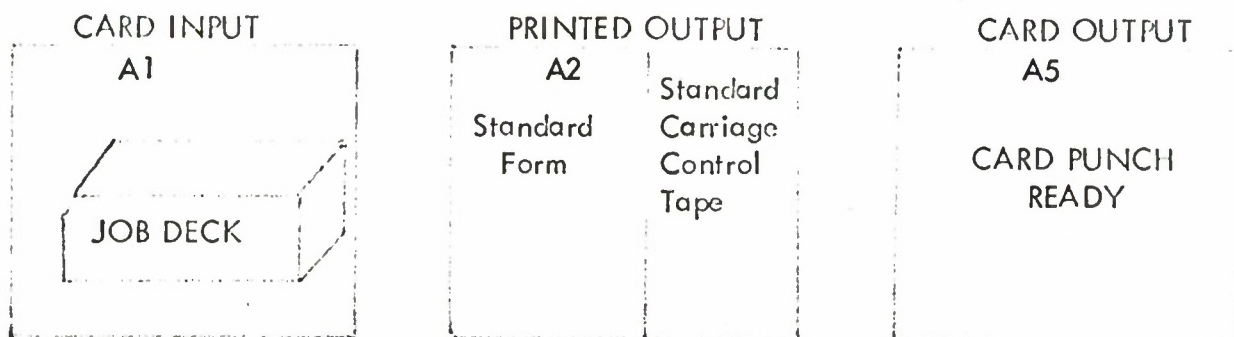
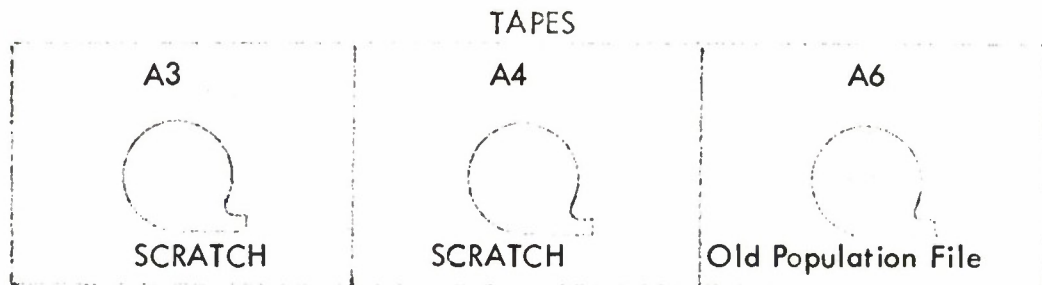
JCVS USAGE FORM

Function: INIPOP 2

Computer: GE-635

Operating Philosophy: Compile Source Program and Go

Stage: INPUT



JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	COBOL	
\$	INCODE	IBMC

(COBOL Source Program Deck - INIPOP)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4R
\$	TAPE	A6,X6R,,POPFILE1,,XXXX
\$	DATA	A1

XXXX = reel number

(Control Card - IP)
(Current File - PF Deck)

\$
***EOF

ENDJOB

JCVS USAGE FORM

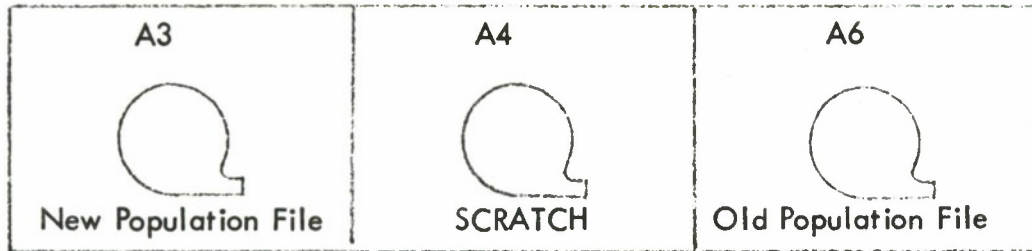
Function: INIPOP2

Computer: GE-635

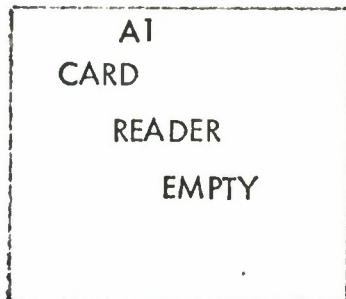
Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT

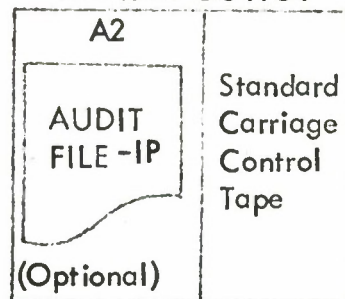
TAPES



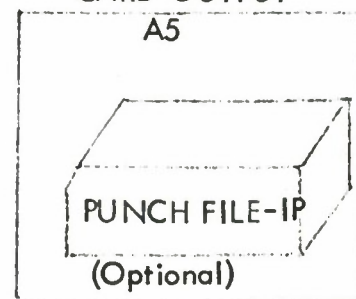
CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JCVS USAGE FORM

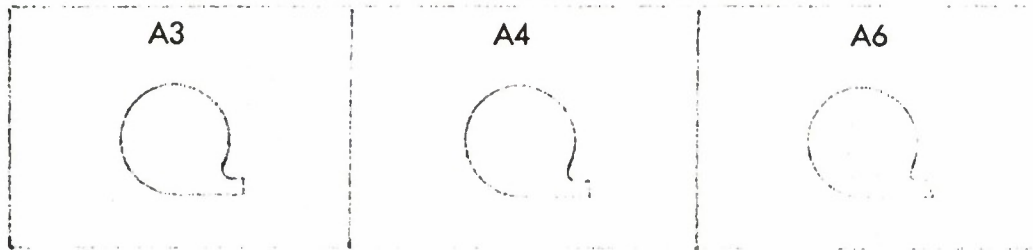
Function: INIPOP 2

Computer: GE-635

Operating Philosophy: Load Binary Deck and Go

Stage: INPUT

TAPES



CARD INPUT

A1



PRINTED OUTPUT

A4

Standard
Form

Standard
Carriage
Control
Tape

CARD OUTPUT

A5

CARD PUNCH
READY

JOB DECK STRUCTURE

(1)	(8)	(16)
\$	IDENT	3154203,DATDY
\$	OPTION	COBOL

(Binary Program Deck - INIPOP)

\$	EXECUTE	DUMP
\$	LIMITS	15,32000
\$	SYSOUT	A2
\$	TAPE	A3,X3S
\$	TAPE	A4,X4R
\$	TAPE	A6,X6R,,POPFIL1,,XXXX
\$	SYSOUT	A5
\$	DATA	A1

XXXX = reel number

(Control Card - IP)
(Current File - PF Deck)

\$
***EOF

ENDJOB

JCVS USAGE FORM

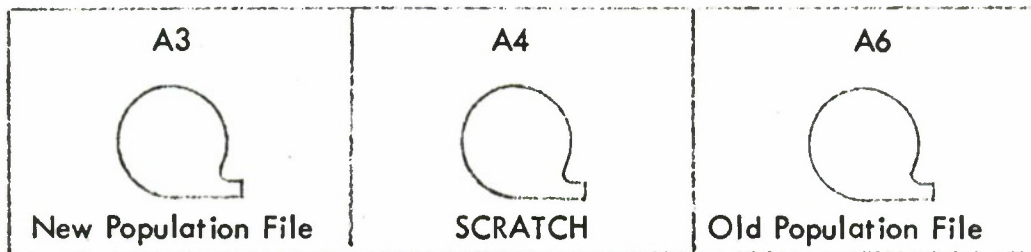
Function: INIPOP2

Computer: GE-635

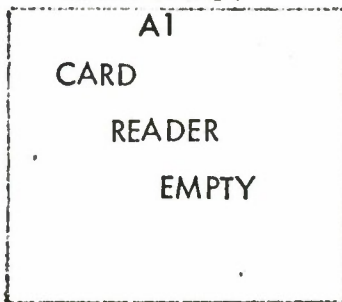
Operating Philosophy: Load Binary Deck and Go

Stage: OUTPUT

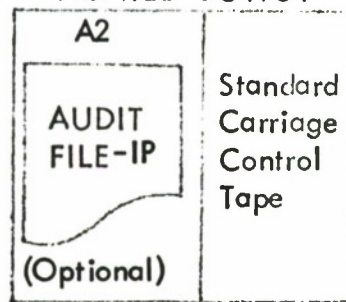
TAPES



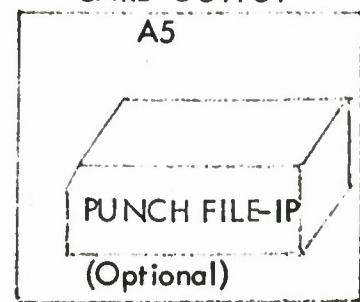
CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



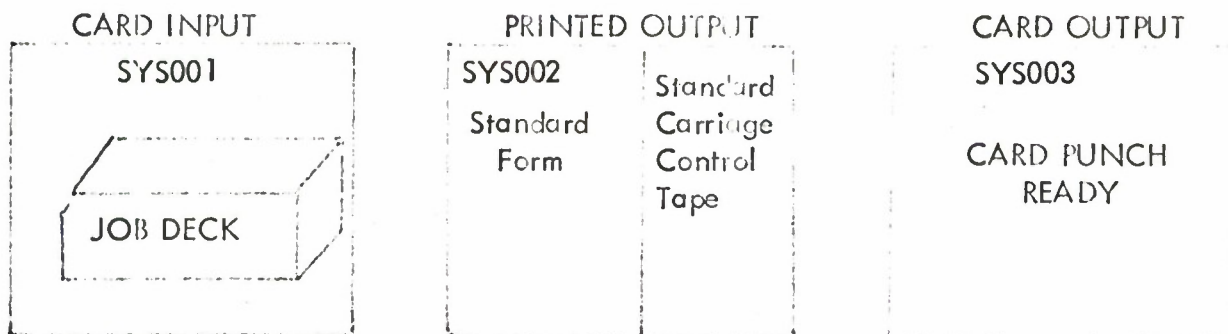
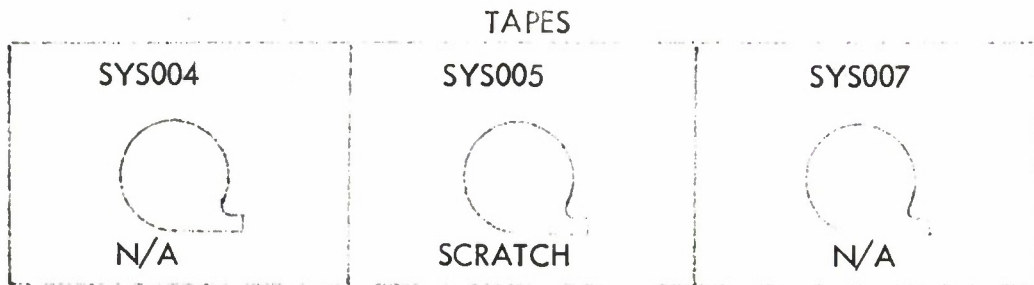
JCVS USAGE FORM

Function: POPFM1

Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go

Stage: INPUT



JOB DECK STRUCTURE

```

/ 'POPFM1, JOB (799,028,010,1084,10,5),ANTCHAGNO,MSGLEVEL = 1
/ 'SI EXEC COBFCLG
/ 'COB.SYSIN DD*
    
```

(COBOL Source Program Deck - POPFM)

```

/ 'GO. SYS002 DD SYSOUT = A
/ 'GO. SYS003 DD SYSOUT = B
/ 'GO. SYS005 DD UNIT = 2400, LABEL = (,NL), DISP = (,KEEP),DSN = POPFILE1
/ 'GO. SYSDUMP DD SYSOUT = A
/ 'GO. SYS001 DD*
    
```

(Control Card - PF)
(Current File - PF2 Deck)

/:

JCVS USAGE FORM




Function: POPFMI

Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

SYS004	SYS005	SYS007
		
N/A	Population File	N/A

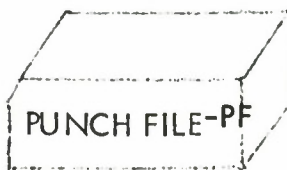
CARD INPUT

<p>SYS001</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>SYS002</p> <div> <p>AUDIT FILE-PF</p>  </div> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>SYS003</p> <div>  <p>PUNCH FILE-PF</p> </div> <p>(Optional)</p>

JCVS USAGE FORM

Function: POPFM2

Computer: IBM 360-50

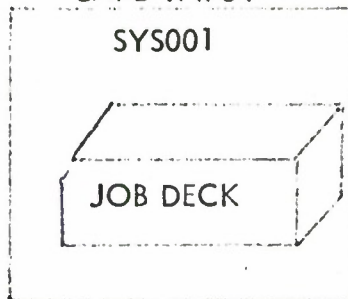
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES

<p>SYS004</p>  <p>Old Population File</p>	<p>SYS005</p>  <p>SCRATCH</p>	<p>SYS007</p>  <p>N/A</p>
--	--	---

CARD INPUT



PRINTED OUTPUT

<p>SYS002</p> <p>Standard Form</p>	<p>Standard Carriage Control Tape</p>
------------------------------------	---------------------------------------

CARD OUTPUT

<p>SYS003</p> <p>CARD PUNCH READY</p>

JOB DECK STRUCTURE

```
//POPFM2 JOB (799,028,010,1084,10.5),ANTCHAGNO,MSGLEVEL = 1
//SI EXEC COBFCLG
//COB.SYSIN DD*
```

(COBOL Source Program Deck - POPFM)

```
//GO.SYS002 DD SYSOUT = A
//GO.SYS003 DD SYSOUT = B
//GO.SYS004,DD UNIT = 2400,LABEL = (,NL), DISP = OLD, VOL = SER= 000649
//GO.SYS005, DD UNIT = 2400,LABEL = (,NL),DISP = (,DELETE)
//GO.SYSDUMP DD SYSOUT = A
//GO.SYS001 DD*
```

(Control Card - PF)
(Current File - PF2 Deck)

/*

JCVS USAGE FORM




Function: POPFM2

Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

SYS004	SYS005	SYS007
		
Old Population File	New Population File	N/A


CARD INPUT

<p>SYS001</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>SYS002</p> <div> <p>AUDIT FILE-PF</p>  </div> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>SYS003</p> <div>  </div> <p>PUNCH FILE-PF</p> <p>(Optional)</p>

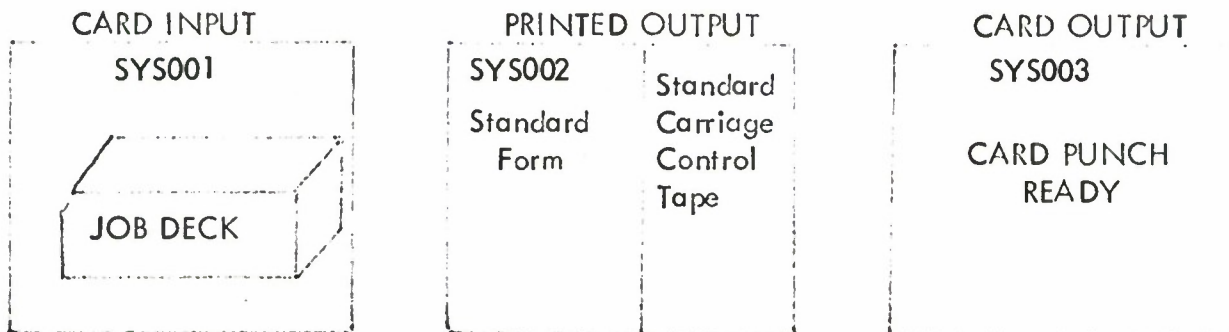
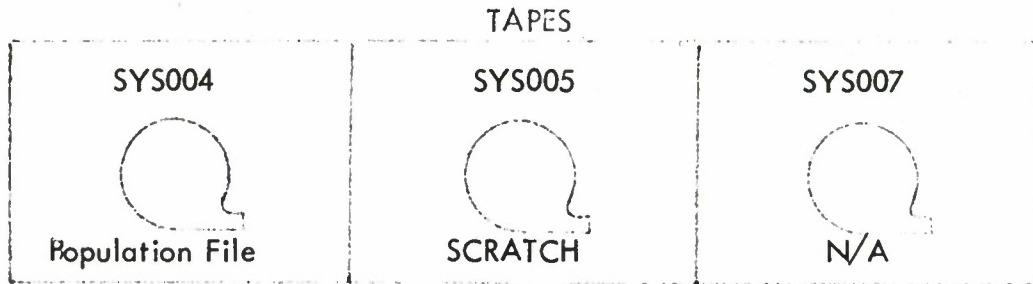
JCVS USAGE FORM

Function: **SELECT**

Computer: **IBM 360-50**

Operating Philosophy: **Compile Source Program and Go**

Stage: **INPUT**



JOB DECK STRUCTURE

```
//SELECT JOB (799,028,010,1084,10,5), ANTCHAGNO, MSGLEVEL = 1
//SI EXEC COBFCLG
//COB.SYSIN DD*
```

(COBOL Source Program Deck - SJCVS)

```
//GO.SYS002 DD SYSOUT = A
//GO.SYS003 DD SYSOUT = B
//GO.SYS004 DD UNIT = 2400, LABEL = (,NL), DISP = OLD, VOL = SER = 000649
//GO.SYS005 DD UNIT = 2400, LABEL = (,NL), DISP = (,KEEP), DSN = JOVSP
//GO.SYSDUMP DD SYSOUT = A
//GO.SYS001 DD*
```

(Control Card - S)
(Test Selection File Deck)

/v

JCVS USAGE FORM




Function: **SELECT**

Computer: **IBM 360-50**

Operating Philosophy: **Compile Source Program and Go**

Stage: **OUTPUT**


TAPES

SYS004	SYS005	SYS007
		
Population File	Source Program File	N/A

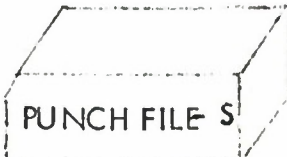
CARD INPUT

<p>SYS001</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>SYS002</p> <div> <p>AUDIT</p> <p>FILE-S</p>  </div> <p>(Optional)</p>	<p>Standard</p> <p>Carriage</p> <p>Control</p> <p>Tape</p>
---	--

CARD OUTPUT

<p>SYS003</p> <div>  </div> <p>PUNCH FILE-S</p> <p>(Optional)</p>
--




JCVS USAGE FORM


Function: SOPMM

Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go

Stage: INPUT

TAPES		
<p>SYS004</p>  <p>Old Source Pgm File</p>	<p>SYS005</p>  <p>SCRATCH</p>	<p>SYS007</p>  <p>N/A</p>

CARD INPUT	PRINTED OUTPUT	CARD OUTPUT
<p>SYS001</p>  <p>JOB DECK</p>	<p>SYS002</p> <p>Standard Form</p> <p>Standard Carriage Control Tape</p>	<p>SYS003</p> <p>CARD PUNCH READY</p>

JOB DECK STRUCTURE

```
//SOPMM JOB (799,028,010,1084,10,5), ANTCHAGNO, MSGLEVEL = 1
//SI EXEC COBFCLG
//COB.SYSIN DD*
```

(COBOL SOURCE PROGRAM DECK)

```
//GO.SYS002 DD SYSOUT = A
//GO.SYS003 DD SYSOUT = B
//GO.SYS004 DD UNIT = 2400,LABEL = (,NL),DISP=OLD,VOL = SER = 000570
//GO.SYS005 DD UNIT = 2400,LABEL = (,NL),DISP = (,DELETE)
//GO.SYSDUMP DD SYSOUT = A
//GO.SYS001 DD*
```

(Control Card -SP)
(Current File -SP2 Deck)

/*

JCVS USAGE FORM




Function: SOPMM

Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT

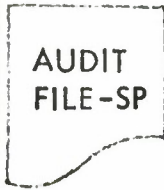
TAPES

<p>SYS004</p>  <p>Old Source Pgm File</p>	<p>SYS005</p>  <p>New Source Pgm File</p>	<p>SYS007</p>  <p>N/A</p>
--	--	--


CARD INPUT

<p>SYS001</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>SYS002</p> <div> <p>AUDIT FILE-SP</p>  </div> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>SYS003</p> <div> <p>PUNCH FILE-SP</p>  </div> <p>(Optional)</p>
--

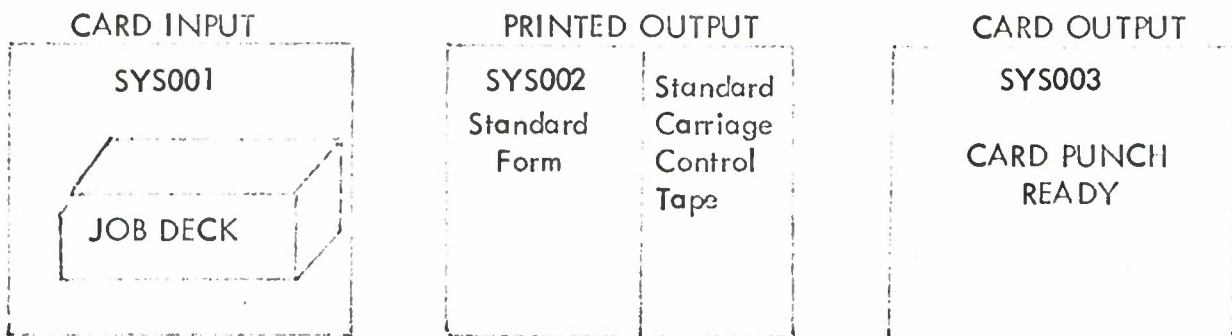
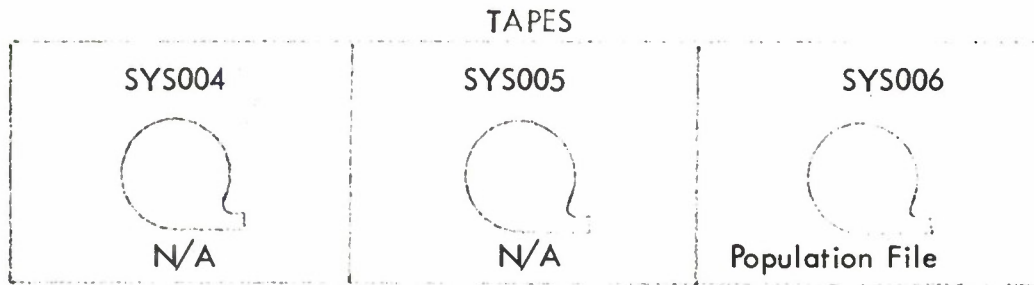
JCVS USAGE FORM

Function: JCVSRP

Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go

Stage: INPUT



JOB DECK STRUCTURE

```
//JCVSRP JOB (799,028,010,1084,10,5),ANTCHAGNO, MSGLEVEL = I
//SI EXEC COB FCLG
//COB.SYSIN DD*
```

(COBOL Source Program Deck - JCVSRP)

```
//GO .SYS002 DD SYSOUT = A
//GO .SYS002 DD UNIT = 2400,LABEL = (,NL),DISP = OLD,VOL = SER = 000649
//GO .SYSDUMP DD SYSOUT = A
//GO .SYS001 DD*
```

(Control Card - RP)

/*

JCVS USAGE FORM

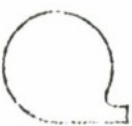


Function: JCVSRP

Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go

Stage: OUTPUT


TAPES

<p>SYS004</p>  <p>N/A</p>	<p>SYS005</p>  <p>N/A</p>	<p>SYS006</p>  <p>Population File</p>
--	--	--


CARD INPUT

<p>CARD READER EMPTY</p>

PRINTED OUTPUT

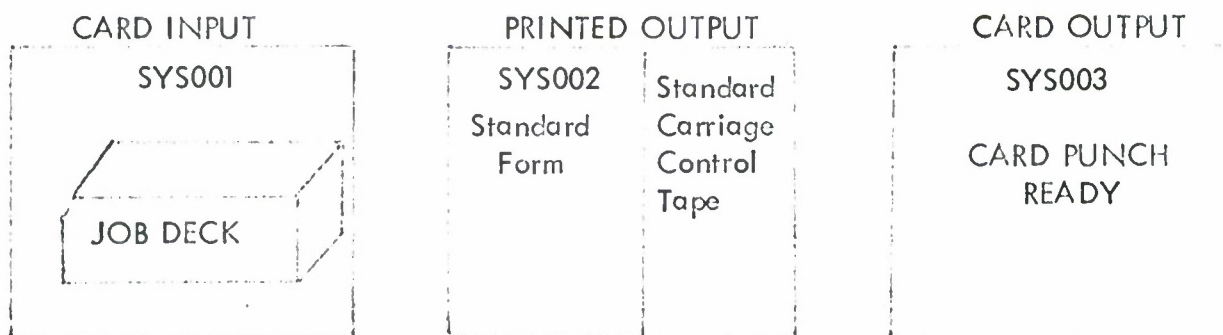
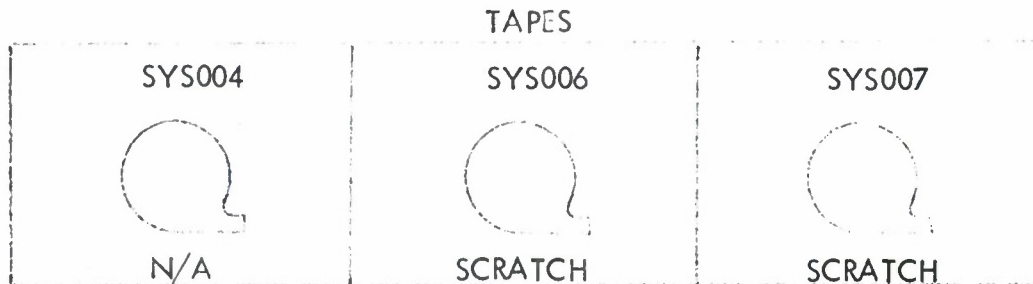
<p>AUDIT FILE-RP</p> 	<p>Standard Carriage Control Tape</p>
--	---

CARD OUTPUT

 <p>PUNCH FILE</p> <p>N/A</p>

JCVS USAGE FORM

Function: INIPOP1
 Computer: IBM 360-50
 Operating Philosophy: Compile Source Program and Go
 Stage: INPUT



JOB DECK STRUCTURE

```
//INIPOP, JOB, (799, 028, OLD, 1084, 10, 5), ANTCHAGNO, MSGLEVEL=1
//SI, EXEC COBFCLG
//COB.SYSIN DD*
```

(COBOL Source Program Deck - INIPOP)

```
//GO.SYS002 DD SYSOUT = A
//GO.SYS003 DD SYSOUT = B
//GO.SYS006 DD UNIT = (2400, DEFER), LABEL = (, NL), DISP = (, DELETE),
//          DSN = MSTRFILE
//GO.SYS007 DD UNIT = 2400, LABEL = (, NL), DISP = (, DELETE)
//GO.SYSDUMP DD SYSOUT = A
//GO.SYS001 DD**
```

(Control Card - IP)
 (Current File - PF Deck)




/*

JCVS USAGE FORM

Function: INIPOPI
Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go
Stage: OUTPUT


TAPES

<p>SYS004</p>  <p>N/A</p>	<p>SYS006</p> 	<p>SYS007</p>  <p>New Population File</p>
--	---	--

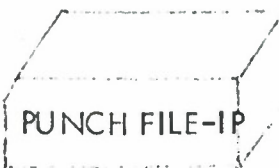
CARD INPUT

<p>SYS001</p> <p>CARD</p> <p>READER</p> <p>EMPTY</p>
--

PRINTED OUTPUT

<p>SYS002</p> <div> <p>AUDIT FILE-IP</p>  </div> <p>(Optional)</p>	<p>Standard Carriage Control Tape</p>
---	---

CARD OUTPUT

<p>SYS003</p> <div>  <p>PUNCH FILE-IP</p> </div> <p>(Optional)</p>

JCVS USAGE FORM

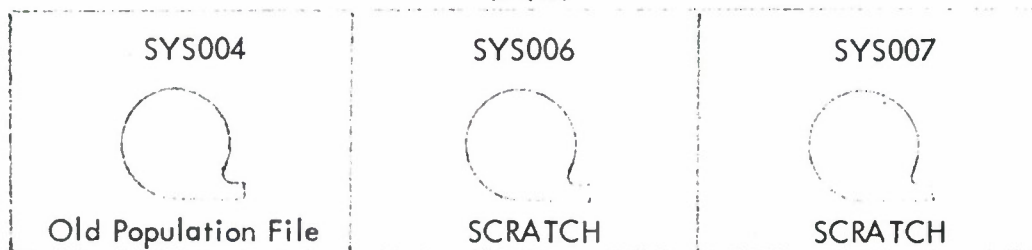
Function: INIPOP2

Computer: IBM 360-50

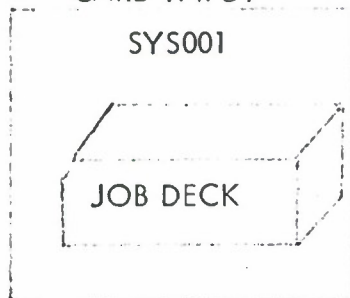
Operating Philosophy: Compile Source Program and Go

Stage: INPUT

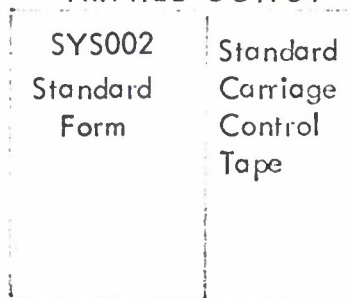
TAPES



CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



JOB DECK STRUCTURE

```
//POPFM2 JOB (799,028,010,1084,10,5), ANTCHAGNO,MSGLEVEL = 1
//SI EXEC COBFCLG
//COB.SYSIN DD*
```

(COBOL Source Program Deck - INIPOP)

```
//GO.SYS002 DD SYSOUT = A
//GO.SYS003 DD SYSOUT = B
//GO.SYS006 DD UNIT = 2400 LABEL = (,NL),DISP = OLD,VOL = SER 000649
//GO.SYS007 DD UNIT = 2400,LABEL = (,NL), DISP = (,DELETE)
//GO.SYSDUMP DD SYSOUT = A
//GO.SYS001 DD*
```

(Control Card - IP)

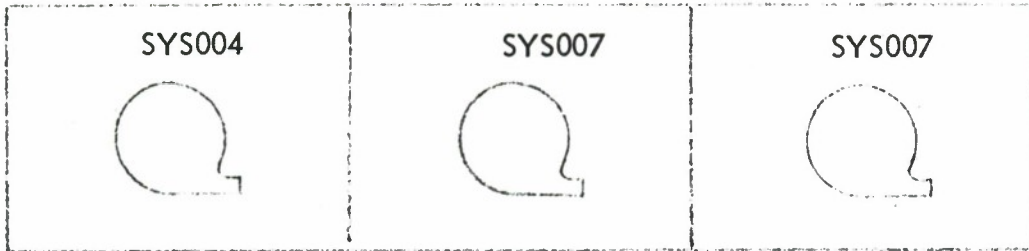
/*

JCVS USAGE FORM

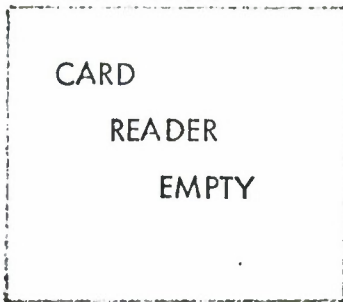
Function: INIPOP2
Computer: IBM 360-50

Operating Philosophy: Compile Source Program and Go
Stage: OUTPUT

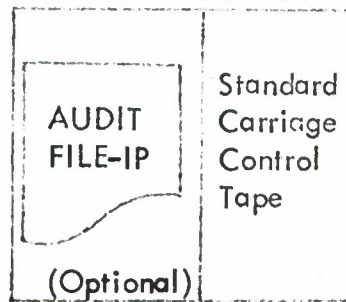
TAPES



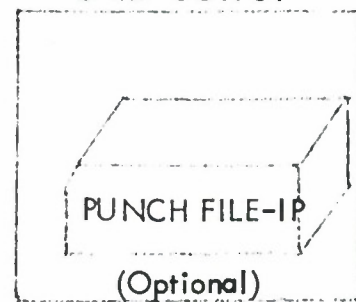
CARD INPUT



PRINTED OUTPUT



CARD OUTPUT



APPENDIX II

SYSTEM HEADER CARD 2

This appendix contains the System Header 2 cards which contain the JCVS model number and the operating system name for each of the five computers.

GE-635		
OVIAL COMPILER VALIDATION SYSTEM 1	GFCOS	0001A002
CDC-6400		
OVIAL COMPILER VALIDATION SYSTEM 1	SCOPE	0001A002
B-5500		
OVIAL COMPILER VALIDATION SYSTEM 1	MCP	0001A002
UNIVAC-1108		
OVIAL COMPILER VALIDATION SYSTEM 1	EXFC2	0001A002
IBM 360-50		
OVIAL COMPILER VALIDATION SYSTEM 1	HASP	0001A002

System Header Card 2

APPENDIX III

ENVIRONMENTAL HARDWARE CARDS

This appendix contains a listing of the three environmental hardware cards associated with each of the five computers. These cards contain tape designations, core sizes and print control character designations when applicable.

GE-635			
A1	A2 FOR LISTING	65K	0001A000
A5 FOR CARDS	A3		0001A000
A4	A6		0001A000
CDC-6400			
INPUT	OUTPUT	01137K	0001A000
PUNCH	TAPE1		0001A000
TAPE2	TAPE3		0001A000
B-5500			
READER	PRINTER	65K	0001A000
PUNCH	TAPE		0001A000
TAPE	TAPE		0001A000
UNIVAC-1108			
CARD-READER-EIGHTY	PRINTER	65K	0001A000
CARD-PUNCH-EIGHTY	UNISERVO A		0001A000
UNISERVO B	UNISERVO C		0001A000
IBM 360-50			
'SYS001' UNIT-RECORD 2540R	'SYS002' UNIT-RECORD 2540P	65K	0001A000
'SYS003' UNIT-RECORD 2540P	'SYS004' UTILITY 2400 UNIT		0001A000
'SYS005' UTILITY 2400 UNIT	'SYS006' UTILITY 2400 UNIT		0001A000

Environmental Hardware Cards

APPENDIX IV

ENVIRONMENTAL SOFTWARE CARDS

This appendix contains a listing of the operating system control cards and the JOVIAL control cards required to signify a JOVIAL source program.

GE-635

IDENT 3154203,DATDY
JOVIAL
FORTRAN
EXECUTE DUMP
LIMITS 15,35000
ENDJOB

*EOF

0001L006
0001L008
0001L009
0001F011
0001F012
0001F017
0001F018

Environmental Software Cards

APPENDIX V

TYPICAL MODULES

This appendix contains a listing of a few typical Population File modules.

APPENDIX VI

This appendix defines the test hierarchy for the JCVS as well as some highlights of JOVIAL as a language and validation in general.

APPENDIX VI

General

This appendix describes the development philosophy of the JOVIAL J3 Population File, including a brief history of the JOVIAL language; an exposition of all validation concepts used in the development of the Population File; the JOVIAL language organization used to identify features to be tested; the JOVIAL language Test Hierarchy; and problems encountered in the development of this file.

Validation

A JOVIAL compiler is said to be validated if each feature conforms to the individual language specifications called features as described in the AFM 100-24. Each feature has been individually considered in terms of its intent and one or more tests have been developed exercising the various options provided by this feature.

Every option provided by every feature in the language is exercised at least once in the tests comprising the Population File. When combinations of feature options were required to insure the validity of a feature, in several instances only a subset of the possible combinations were included in the Population File.

JOVIAL History

The JOVIAL language was originally developed in 1958, four years after the development of the first programming language, FORTRAN. It is a procedure oriented higher-order programming language. JOVIAL, a derivative of ALGOL 58, was designed specifically to describe computerized solutions to command and control problems.

As stated by AFM 100-24,

"The prime motivation for the development of JOVIAL was the desire to have a common, powerful, easily understandable and mechanically translatable programming language suitable for wide-range applications."

In addition to the above requirements, the language was to adhere to the following design goals?

1. Centralized data communication facilities
2. Machine independence
3. Logical and Algebraic expression capabilities
4. Symbol manipulation capabilities

5. Readability
6. Conciseness
7. Training Simplicity
8. Ease of maintenance

Based upon the aforementioned requirements and goals, the JOVIAL language greatly enhances the problem definitional capabilities of the programmer. The following paragraphs illustrate the wisdom of the JOVIAL design.

Command and control problems are in general extremely large in terms of the data base to be gathered, manipulated and reported; and the variety of computations to be performed on the data base. Consequently, the programming system necessary to solve this problem is so vast that several hundred programmers may be required to perform the individual programming tasks. Because of the number of individual programs and programmers involved in a command and control development, program/programmer communication becomes a critical problem.

In order to alleviate this situation, a Communication Pool (COMPOOL) was developed which serves as a central source of data description. Centralizing all global data descriptions facilitates changing data item parameters and automatically reflecting these changes throughout the machine language programs. This feature of the JOVIAL language alone has saved enormous amounts of time and money in several command and control system developments.

Application Requirements

Programming languages are created in order to respond to common sub-solutions within application areas. Programming languages supply capabilities that satisfy these common sub-solutions while suppressing the repetition and details of solution.

Many of these capabilities are present in most languages and provide for general application requirements such as:

1. Program Control
2. Information Transfer
3. Input/Output Communication
4. Arithmetic Operations
5. Data Item Definitions
6. Storage Allocation - Static

to name a few.

Additional power may be provided by a language by adding capabilities of a general nature that make the language useful problem solving tool for a broader class of problems or by adding more extensive capabilities but oriented towards specific area.

Generally oriented features:

1. Algebraic Expression Evaluation
2. Logical Expressions Evaluation
3. Data Structure Definitions

Specifically oriented features:

1. Formula Manipulation
2. List Processing

Language Organization

The JOVIAL language was developed to respond to command and control applications. Each feature of the language may be interpreted as a language response to a programming function required by a command and control applications programmer. Using this notion as a point of departure, the JOVIAL language has been organized into the following programming functions in order to organize the identification of features to be tested.

1. Data Concepts
 - 1.1 Internal Data Concepts
 - 1.1.1 Data Definitions
 - 1.1.1.1 Constant Formulation
Integer - I
Fixed Point - A
Floating Point - F
Octal - O
Dual - D
Transmission Code - T
Hollerith - H
Boolean - B
Status - S
 - 1.1.1.2 Simple Data Definitions
Integer - I
Fixed Point - A
Floating Point - F
Dual - D
Transmission Code - T
Hollerith - H
Boolean - B
Status - S
 - 1.1.1.3 Structured Data Definitions
Tables
Arrays

- 1.1.1.4 Control Definitions
 - Item Switch
 - Index Switch
 - 1.1.2 Data Referencing
 - 1.1.2.1 Simple Items
 - 1.1.2.2 Data Structure Items
 - Table Items
 - Array Items
 - 1.1.2.3 Data Structure
 - Table Entries
 - 1.1.2.4 Special Referencing
 - ALL
 - BIT
 - BYTE
 - CHAR
 - ENT
 - ENTRY
 - LOC
 - MANT
 - NENT
 - NWDSEN
 - ODD
 - POS
 - 1.2 External Data Concepts
2. Procedure Concepts
 - 2.1 Procedure Formations
 - 2.1.1 Formulas
 - 2.1.1.1 Numeric
 - 2.1.1.2 Boolean
 - 2.1.2 Relations
 - 2.2 Program Organization Statements
 - 2.2.1 PROGRAM
 - 2.2.2 Subprogram Organization
 - 2.2.2.1 Procedures
 - User Defined
 - PROC
 - CLOSE
 - Language Defined
 - REMQUO
 - 2.2.2.2 Functions
 - User Defined
 - Language Defined
 - ABS
 - REM
 - 2.2.3 RETURN

- 2.3 Executable Statements
 - 2.3.1 Control Statements
 - 2.3.1.1 Unconditional Control Transfers
 - GOTO
 - STOP
 - 2.3.1.2 Conditional Control Transfers
 - IF
 - IFEITH
 - ORIF
 - 2.3.1.3 Iteration Control
 - FOR
 - TEST
 - 2.3.2 Input/Output Statements
 - INPUT
 - OPEN INPUT
 - SHUT INPUT
 - OUTPUT
 - OPEN OUTPUT
 - SHUT OUTPUT
 - 2.3.3 Replacement Statements
 - 2.3.3.1 Assignment Statement
 - 2.3.3.2 Exchange Statement
- 2.4 Compiler Directing Concepts
 - 2.4.1 DEFINE
 - 2.4.2 LIKE
 - 2.4.3 OVERLAY
 - 2.4.4 MODE
 - 2.4.5 DIRECT, JOVIAL

JCVS Testing Concepts

The following sections discuss briefly the scope of the JCVS and the tests selected for inclusion in the Population File.

JCVS Scope

For purposes of the JCVS, the JOVIAL system to be tested is assumed to consist of a processor that compiles standard JOVIAL source program statements called the JOVIAL compiler and all programs and subroutines used by the JOVIAL object code generated from standard JOVIAL statements. The JCVS is designed to test both the compilation and execution of specific JOVIAL features.

Test Assumptions - Data

The foregoing JOVIAL language organization has guided the identification of language features to be tested. In order to validate the JOVIAL compiler ideally, each variant of a specific language feature should be validated. The validation of each feature variant of the JOVIAL language, however, is not always possible. For example, how can one determine that any value stored in a floating point item is truly stored as a floating point number; how can one determine that a fixed point constant has actually been converted to a fixed point binary constant. Looking at information as it resides in the internal storage medium, we may observe a string of bits, however, the interpretation of this content is inconclusive. Consequently, some of the features provided by the JOVIAL language are not susceptible to validation independently. These features are generally the more basic notions in the language and will be used constantly in the Test Modules comprising the Paulation File. With repeated correct usage of these basic concepts, it is hoped that the credibility of their required implementation will be considerably improved.

With these thoughts in mind, the following aspects of the data definitional capabilities of the JOVIAL language will not be tested independently and will be assumed present in the language and correctly implemented:

1. The ability to specify any item type and have it retained according to its defining attributes.
2. The ability to formulate any constant type and have it retained according to its defining attributes.
3. The ability to specify any data structure type (table, array, etc.) and have it retained according to its defining attributes.

The JOVIAL language provides the user with a myriad of options to form constants, simple items, tables, and arrays. There are so many data defining attributes possible in JOVIAL that exercising each option in an independent test is quite impossible. As a compromise, the test repertoire will use a subset of data definitions that exercise, at least once, all of the data attributes available to define data items and structures. In addition, the repertoire will utilize every variation provided to formulate constants with the exception of the dual item definitions which will be exercised in part only. It goes without saying that the formation of acceptable JOVIAL symbols (names, labels, etc.) will be exercised every time a symbol is formed.

Test Assumptions - Procedures

The JOVIAL language provides the user with the ability to process formulas and relations; it provides for program organization and it provides certain compiler directing features. Every variant of each of these features will be tested at least once. Further substantiation of the ability of a feature to perform its intended function will be supplied by its correct use as a support statement in other test modules.

With these thoughts in mind, the following aspects of the procedural capabilities of the JOVIAL language will be assumed to be present in the language and correctly implemented:

1. The ability to name a statement with a label.
2. The fact that normal procedural control passes from one JOVIAL statement to the next.

Test Hierarchy

Although the language organization serves to compartmentalize the various features of the language, it remains for the test hierarchy to specify the order in which these features are to be tested. This order must be specified to insure that the supporting JOVIAL statements used to compare test modules in which they participate may be validated.

A further ordering must be prescribed when testing out data and procedural language elements. Since procedural statements, for the most part, make reference to pieces of data, it seems reasonable to assume that data declarations should be validated before procedural statements. As a general rule, when a data concept is to be validated, it will be defined, structured, preset, and referenced since these are the only data oriented concepts languages provide. When a procedural statement is to be tested, it will be invoked in order to examine whether the procedure performs its stated functions.

There exist language concepts that are inexorably linked together; switch declarations and switch invocations; procedure declarations and procedure calls, etc., that individually serve little useful function but when utilized in combination provide a powerful programming tool. These notions will be validated fully.

Axioms

The validity of JOVIAL test features must be determined by the execution of a number of JOVIAL statements called support statements. Since these statements are themselves JOVIAL statements, they must be validated as is any other JOVIAL statement. Once a JOVIAL statement has been validated, however, the statement may be used to check the results of the validations of other JOVIAL statements.

Following is a list of these JOVIAL concepts that are required as basic axioms. The ability to:

1. Define and preset a hollerith item.
2. Assign a hollerith constant to a hollerith variable.
3. Execute the GOTO statement-name.
4. Define a procedure, invoke a procedure, and return from a procedure; input parameter list, one variable.
5. IF clause.

These axioms will be validated first.

Following the Axiom validation will be the validation of the data and procedures. The complete order for listing including all DDI-NO references and all CED-NO cross references is given in the Test Hierarchy Outline.

Test Modules

Although the concept of test modules has been described in section 2.3 of the Users Manual, that description will be repeated here.

A Test Module is a collection of JOVIAL statements that test a particular feature of the JOVIAL compiler. The feature may be a JOVIAL concept, a single JOVIAL statement or a collection of JOVIAL statements. Included in each Test Module are the:

1. Test identification field
2. Input test data fields
3. Test results fields
4. Expected results fields
5. Initialization procedures
6. Test statements comprising the test
7. Results analysis procedures
8. Output procedures

Test Modules are located on the Population File in order of their test serial number, the DDI-NO. With each test statement is associated a sequence number within the DDI-NO that specifies the ordering of the statements within the DDI-NO.

In most cases, a Test Module can be considered as an independent JOVIAL source program. There are instances, however, when the data to be operated upon by one Test Module resides in another Test Module. Consequently, in these cases, the JOVIAL source program is not independent. Exit from all modules passes through the last statement of the module to the first statement of the following module or the TERM statement. Because of this feature, a JOVIAL test module may follow any other JOVIAL test module.

Mandatory Modules

Some test modules are not independent in the sense that they may be included by themselves in a generated JOVIAL source program. These test modules depend upon other test modules called mandatory modules in the Population File for either of two reasons:

1. The mandatory test module contains data definitions that are required by the dependent test module, or
2. The mandatory test module contains support statements whose validity must be established before a successful execution of the dependent module feature may be considered valid.

The five support statement Axioms are considered to be constantly mandatory and consequently are included in every generated JOVIAL source program.

All other mandatory modules will be invoked by specific test modules. Every mandatory module will be invoked by at least one test module and the relationship between test modules and mandatory modules, if any exist, will be enumerated in the Test Hierarchy Outline.

Test Module Content

Each Test Module will be identified by a test serial number called the DDI-NO occupying columns 73-76 of every card in the Test Module. Within each Test Module, individual cards will be given sequence numbers which will occupy columns 78-80.

Identification information describing various aspects of the test module is provided in the Test Header Card (card sequence number 001, see Users Manual Section 4.1.2.2.1). The Test Name in this card will be identical to the name used in the various section headings of the Test Hierarchy Outline. For example, test module 0500 will have the Test Name DEFINE-PRESET H ITEM, the identical name used to entitle Section 2.1 of the Test Hierarchy Outline.

Any CED-NO's to which a test module refers will be given in the appropriate positions on the Test Header Card. For example, test module 0500 refers to both CED-NO's 2463 and 2464. These numbers are included in their respective fields on the Test Header Card.

Any mandatory DDI-NO upon which the test module depends is included in columns 59-62 of this card.

The second card (card sequence number 002) in every test module contains the classification (section number) of the Test Hierarchy Outline. Columns 3-22 contain the words CLASSIFICATION NUMBER. Columns 26-33 contain the classification number in the following form XX.XX.XX.

The third card (card sequence number 003) in every test module contains the following statement from column 3-50:

THIS MODULE TESTS THE ABILITY OF THE COMPILER TO. . .

The fourth card and subsequent cards in the test module are used to expand further on the test description.

Following the last descriptive card in the test are the test and support statements themselves.

Test Module Output

The results of each test module are printed in a standard form. At least two printed lines are always output. The first line always consists of:

TEST MODULE XXXX

where XXXX is the DDI-NO of the module under test. The second line prints either of two messages:

TEST SUCCESSFUL (optional commentary)

or

TEST FAILED (optional commentary)

A blank line is automatically supplied by the JCVS separating consecutive test results.

JCVS Input/Output Characteristics

Since the implementation of the JOVIAL language is not closely monitored, deviations in implementation can and often do occur. Implementors take it upon themselves to change certain of the language specifications for any of many reasons. In particular, the implementation of the input/output specifications of the language have varied markedly in the past from implementor to implementor.

In addition, the language specifications do not permit the user to apply formatting to any results achieved by a JOVIAL program. Consequently, in order to format output information either a higher order language that permits formatting or an assembly language must be used.

It was originally intended to display actual versus expected results. Since the input/output capabilities of JOVIAL are ill-defined to non-existent, the initial plans for presentation of output was modified. Since FORTRAN offers excellent formatting capabilities, it was decided to use FORTRAN subroutines whenever formatting was required.

The notion of displaying expected versus actual results was abandoned for purposes of this project when it became apparent that converting internally computed numerical JOVIAL results from binary to decimal would be accomplished through FORTRAN conversion programs rather than JOVIAL conversion programs. Consequently, the tests would be invalid because certain processes would be carried out outside of JOVIAL language implementation. As a result of the above mentioned JOVIAL inadequacies, the following only qualitative output messages were printed. Test results printed out under these conditions do not fully reveal the causes of errors in tests devoted to the accuracy of arithmetic operations. The results of syntax-semantics testing, however, are not impaired by these constraints.

The JOVIAL input/output specifications described in AFM 100-24 do not adequately describe certain aspects of the file:declaration. In particular it is left to the implementor to specify the device:name. It is unclear precisely what constitutes a device:name and if the device:name remains inflexible for one computer configuration or precisely how it varies. In addition, the relationships that exist between the JOVIAL defined input/output statuses and the computer configuration software or hardware is not clear. It may be impossible to reconcile the input/output concepts provided by JOVIAL with the input/output concepts provided by the hardware or software environment.

Until a more firm relationship can be established, no testing of the file:declaration and, consequently, of the JOVIAL input/output statements will be provided at this time. These features are considered to be non-standard features.

FORTRAN I/O Usage

Test module 9998 uses the FORTRAN I/O format statement

```
PRT (date-name) $
```

For each computer configuration this statement must be provided in a form compatible to the hardware and software environment.

Population File Conversion

The Population File is keypunched using the IBM 026 character set. Some of the equipment utilized on this project use different character sets. In general, only the card punches for the so-called special characters vary from character set to character set. A complete list of these special characters together with their punched card representations is given in the accompanying Character Set Table.

It may be desirable to convert the Population File from one character set representation to another. The JCVS provides a FORTRAN routine called CONVER that performs this conversion. This routine varies slightly from configuration to configuration but performs the same task.

In general, this deck is submitted to the computer in the following form:

1. Leading Operating System Control Cards
2. CONVER Source Program Deck
3. Data Card 1

4. Data Card 2
5. Data to be Converted (Card Deck)
6. Final Operating System Control Cards

Data Card 1 contains the special characters in the data deck following that are to undergo translation. Data Card 2 contains the special characters to which the original special characters encountered in the Data Deck will be converted.

Each character of each card in the Data Deck is tested for possible conversion. If a conversion is to be made, the original special character is looked up in a table developed from the corresponding special characters in Data Card 1 and Data Card 2. If a match is accomplished, the new special character is substituted.

Every character in Data Deck is tested in this way. If a card does in fact contain one or more characters to be converted, the converted card as well as the original card, is printed. If a card contains no characters to be converted, only the original card is printed.

Data Card 1 and Data Card 2 have identical formats described as follows:

<u>Columns</u>	<u>Description</u>
1-2	Number of special characters.
3-80	Each column on Data Card 1 contains a character to be converted while the corresponding column on Data Card 2 contains the character to be converted to.

Following are the deck structures for the four computers used on the project:

1) UNIVAC 1108

7
8 RUN 1CONVER, DOCG, 5,300

7
8 1 FOR CONVER

(CONVER Source Deck)

7
8 XQT CONVER

(Data Card 1)

(Data Card 2)

(Data Deck)

7
8 FIN

2) IBM 360-50

```
//CONVER, JOB(799,028,010,1084,10,5), ANTCHAGNO, MSGLEVE=1
//SI EXEC FORTGCLG
//FORT.SYSIN DD *
    (CONVER Source Deck)
//GO.SYSIN DD *
    (Data Card 1)
    (Data Card 2)
    (Data Deck)
/*
```

3) CDC-6400

```
JOB, 93007,10,10,35000. CONVER
RUN(S)
LGO.
(End of Record Card)
(CONVER Source Deck)
(End of Record Card)
(Data Card 1)
(Data Card 2)
(Data Deck)
(End of File Card)
```

4) GE-635

```
$ IDENT 3154203,DATDY
$ FORTRAN
$ INCODE IBMF
    (CONVER Source Deck)
$ OPTION FORTRAN
$ EXECUTE
$ LIMITS 15,32000
$ DATA 01
    (Data Card 1)
    (Data Card 2)
$ DATA 05
    (Data Deck)
$ ENDJOB
***EOF
```

CHARACTER SET TABLE

The following characters from the JOVIAL character set require conversion when translating from the character set of one computer to that of the other. Following is a chart showing the Hollerith representation used by each computer.

Character	Columns	GE-635	CDC-6400	UNIVAC-1108	IBM 360-50
+	3	12	12	12	12-8-6
=	4	0-5-8	3-8	3-8	6-8
\$	5	11-3-8	11-3-8	11-3-8	11-3-8
;	6	11-6-8	12-7-8	11-6-8	11-6-8
,	7	0-6-8	4-8	4-8	5-8
(8	12-5-8	0-4-8	0-4-8	12-5-8
)	9	11-5-8	12-4-8	12-4-8	11-5-8
>	10	6-8	11-7-8	6-8	0-6-8
<	11	12-6-8	12-0	12-6-8	12-4-8

TEST HIERARCHY OUTLINE

1. SYNTAX

Tests of the following syntax will be performed in the various test modules of the Population File. The accompanying tables provide a cross reference to some of the uses of the specified syntactic types as indicated by the associated DDI-NO's.

DDI-NO

1.1 Primitives

ABS	5100	
ALL	4390	
AND	5810	5815 6110 6115 6135
ARRAY	3500	3505 3510 3515 3520 3525 3530 3535 3540 3545
ASSIGN	This feature deals with direct code and will not be tested.	
BEGIN	1500	1505 1510 1550 1555
BIT	4000	4005 4010 4015
BYTE	4080	4085 4090 4095
CHAR	This feature is machine dependent and will not be tested.	
CLOSE	This feature is an I/O concept and will not be tested.	
DEFINE	6500	
DIRECT	No test of machine language concepts will be provided.	
END	1500	1505 1510 1550 1555
ENT	4145	4150 4155 4160 4165
ENTRY	4120	4125 4130 4135 4140
EQ	1500	1505 1510 1550 1555
FILE	This feature is an I/O concept and will not be tested.	
FOR	5340	5342 5344 5346 5348
GOTO	1500	1505 1510 1550 1555
GQ	5820	5825
GR	5820	5825
IF	5820	5825
IFEITH	5310	1445 1450 1455
INPUT	This feature is an I/O concept and will not be tested	

ITEM	1000	1005	1010	1015	1020	1025	1030	1035
JOVIAL	No test of machine language concepts will be provided.							
'LOC	4175	4178	4181	4187	4190			
LQ	5820	5825						
LS	5820	5825						
MANT	This feature is machine dependent and will not be tested.							
MODE	This feature is not tested.							
NENT	4200	4205	4210	4215	4220	4225		
NOT	6125	6130	6135					
NQ	5820	5825						
NWDSEN	4300	4305	4310					
ODD	4340	4345	4350					
OPEN	This feature is an I/O concept and will not be tested.							
OR	5820	6100	6105	6120	6135			
ORIF	5310	1445	1450	1455				
OUTPUT	This feature is an I/O concept and will not be tested.							
OVERLAY	6700	6705	6710	6715	6720	6725	6730	6735
POS	This feature is an I/O concept and will not be tested.							
PROC	4465	4470	4475	4480	4485			
'PROGRAM	4175	4196	4199					
RETURN	5180	5185	5190					
SHUT	This feature is an I/O concept and will not be tested.							
START	0001							
STOP	This feature is not tested.							
STRING	3600	3605	3610	3615	3620	3625	3630	3635
SWITCH	3900	3905	3910	3915	3920	3925	3930	3935
TABLE	2500	2505	2510	2515	2520	2525	2530	2535
TERM	9999							
TEST	5390	5392	5394					
						3640	3645	3650
						3940	3945	3950
						3955	3960	3965

1.2 Ideograms

+	5425	5430	5435	5440
-	5455	5460	5465	

*	5425	5430	5435	5440
/	5440	5445	5450	5455
.	All test modules.			
,	5510	5515	5505	
=	6200			
(4465	4470	4475	4480
)	4465	4470	4475	4480
\$	All test modules.			
**	5455	5460	5475	5480
=	6400	6405	6410	6415
"		6420	6425	
	All test modules.			
(\$	4480	4490	4825	
\$)	4480	4490	4825	
...	1000	1010	1015	
(/	5500			
/)	5500			
(*				
*)				

1.3 Single Letter Symbols

1.3.1 Abbreviation 4465 4470 4475 4480

1.3.2 Loop Variable 5350 5355 5360

1.4 Names

1.4.1 Labels All test modules.

1.4.2 Identifiers All test modules.

2. AXIOMS

Prove the axioms contained in the following required mandatory modules.

	<u>DDI-NO</u>
2.1	0500
2.2	0505
2.3	0510
2.4	0515
2.5	0520

2.1

DEFINE-PRESET H ITEM

2.2

ASSIGNMENT STAT H

2.3

GOTO STAT-NAME

2.4

PROCEDURE, ERR, PRINT

2.5

IF CLAUSE

3. DEFINE, PRESET AND REFERENCE USED DEFINED DATA

3.1 Simple Items

3.1.1 Define Simple Items

<u>Classification Number</u>		<u>DDI-NO</u>
3.1.1.1	Integer Item	1000
3.1.1.2	Floating Item	1005
3.1.1.3	Fixed Item	1010
3.1.1.4	Dual Item	1015
3.1.1.5	Hollerith Items	1020
3.1.1.6	Transmission Code Items	1025
3.1.1.7	Status Items	1030
3.1.1.8	Boolean Items	1035

3.1.1.1

Integer Item

3.1.1.2

Floating Item

3.1.1.3

Fixed Item

3.1.1.4

Dual Item

3.1.1.5

Hollerith Items

3.1.1.6

Transmission Code Items

3.1.1.7

Status Items

3.1.1.8

Boolean Items

3.1.2 Form Constants and Preset Simple Items

Classification Number		DDI-NO
3.1.2.1	Integer Item	1200
3.1.2.2	Floating Item	1205
3.1.2.3	Fixed Item	1210
3.1.2.4	Dual Items	1215
3.1.2.5	Hollerith Items	1220
3.1.2.6	Transmission Code Items	1225
3.1.2.7	Status Item	1230
3.1.2.8	Boolean Items	1235

3.1.3 Reference Defined and Preset Items

Classification Number		DDI-NO
3.1.3.1	Integer Item	1400
3.1.3.2	Floating Item	1405
3.1.3.3	Fixed Item	1410
3.1.3.4	Dual Item	1415
3.1.3.5	Hollerith Item	1420
3.1.3.6	Transmission Code Item	1425
3.1.3.7	Status Items	1430
3.1.3.8	Boolean Items	1435

3.2 Ordinary Tables

3.2.1 Ordinary Table Definition

Define ordinary tables of the following types.

Classification Number	Classification Name			DDI-NO
3.2.1.1	TABLE	Name	V int-1 S	1500
3.2.1.2	TABLE	Name	V int-1 S	1505
3.2.1.3	TABLE	Name	V int-1 S	1510
3.2.1.4	TABLE	Name	V int-1 -	1515 1605
3.2.1.5	TABLE	Name	R int-1 S	1520
3.2.1.6	TABLE	Name	R int-1 S	1525
3.2.1.7	TABLE	Name	R int-1 S	1530
3.2.1.8	TABLE	Name	R int-1 S	1535
3.2.1.9	TABLE	Name	V int-1 P	1540
3.2.1.10	TABLE	Name	V int-1 P	1545 1630
3.2.1.11	TABLE	Name	V int-1 P	1550
3.2.1.12	TABLE	Name	V int-1 P	1555 1625
3.2.1.13	TABLE	Name	R int-1 P	1560
3.2.1.14	TABLE	Name	R int-1 P	1565
3.2.1.15	TABLE	Name	R int-1 P	1570
3.2.1.16	TABLE	Name	R int-1 -	1575
3.2.1.17	TABLE	Name	R int-1 -	1580
3.2.1.18	TABLE	Name	R int-1 -	1585
3.2.1.19	TABLE	Name	V int-1 -	1590
3.2.1.20	TABLE	Name	V int-1 -	1595
3.2.1.21	TABLE	Name	V int-1 -	1600
3.2.1.22	TABLE	Name	R int-1 -	1610
3.2.1.23	TABLE	Name	V int-1 S	1615
3.2.1.24	TABLE	Name	V int-1 P	1620
3.2.1.25	TABLE	Name	R int-1 -	1635

3.2.2 Ordinary Table Items

Define, Preset and Reference all item types within the following table types.

Classification
Number

DDI-NO

3.2.2.1	TABLE	Name	V	int-1	S	\$	
		Hollerith Item					1700
		Transmission Code Item					1705
		Integer Item					1710
		Fixed Point Item					1715
		Floating Point Item					1720
		Status Item					1725
		Boolean Item					1730
		Dual Item					1735
3.2.2.2	TABLE	Name	V	int-1	P	\$	
		Hollerith Item					1740
		Transmission Code Item					1745
		Integer Item					1750
		Fixed Point Item					1755
		Floating Point Item					1760
		Status Item					1765
		Boolean Item					1770
		Dual Item					1775
3.2.2.3	TABLE	Name	R	int-1	P	\$	
		Hollerith Item					1780
		Transmission Code Item					1785
		Integer Item					1790
		Fixed Point Item					1795
		Floating Point Item					1800
		Status Item					1805
		Boolean Item					1810
		Dual Item					1815
3.2.2.4	TABLE	Name	R	int-1	S	\$	
		Hollerith Item					1820
		Transmission Code Item					1825
		Integer Item					1830
							1900
							1905
							1910
							1915

Classification
Number

DDI-NO

Fixed Point Item
Floating Point Item
Status Item
Boolean Item
Dual Item

1835 1840 1920 1925
1845 1930
1850 1935
1855 1940
1860 1945

Summary of some modules using Ordinary
Table Items.

Hollerith Item
Transmission Code Item
Integer Item

1505 1550 1525 1570 1590 1575
1505 1550 1525 1570 1595 1580
1500 1545 1530 1560 1605 1610
1615 1620 1625 1635

Fixed Point Item
Floating Point Item

1500 1545 1530 1560 1515
1500 1545 1530 1560 1595 1515
1580

Status Item

1510 1555 1520 1565 1600 1585
1630

Boolean Item
Dual Item

1510 1555 1520 1565 1590 1575
1510 1555 1520 1565 1600 1585

3.3 Defined Tables

3.3.1 Defined Entry Table Definition

Define Defined Entry Tables of the following types. Use all table descriptors at least once.

Classification
Number

DDI-NO

3.3.1.1 TABLE Name V int-1 - - int-2 \$ 2500
3.3.1.2 TABLE Name V int-1 P - int-2 \$ 2505 2535
3.3.1.3 TABLE Name V int-1 S - int-2 \$ 2510 2540

<u>Classification Number</u>							<u>DDI-NO</u>
3.3.1.4	TABLE	Name	R	int-1	-	int-2	\$ 2515
3.3.1.5	TABLE	Name	R	int-1	S	int-2	\$ 2520
3.3.1.6	TABLE	Name	R	int-1	P	int-2	\$ 2525
3.3.1.7	TABLE	Name	R	int-1	-	int-2	\$ 2530

3.3.2 Defined Entry Table Items

Define Preset and Reference all item types within the following Defined Entry tables. Use all possible item types at least once.

<u>Classification Number</u>					<u>Classification Name</u>		<u>DDI-NO</u>
3.3.2.1	TABLE	Name	V	int-1	-	int-2	\$ 2500 2535 2540
		Integer Item					
3.3.2.2	TABLE	Name	V	int-1	P	int-2	\$ 2505
		Fixed Items					
3.3.2.3	TABLE	Name	V	int-1	S	int-2	\$ 2510
		Hollerith Items					
3.3.2.4	TABLE	Name	R	int-1	-	int-2	\$ 2515
		Transmission Item					
3.3.2.5	TABLE	Name	R	int-1	S	int-2	\$ 2520
		Boolean Item					
		Status Item					
		Integer Item					
3.3.2.6	TABLE	Name	R	int-1	P	int-2	\$ 2520
		Floating Item					
3.3.2.7	TABLE	Name	R	int-1	-	int-2	\$ 2525
		Dual Item					
		Summary of some modules using Defined Entry Table Items.					2530

Classification
Number

DDI-NO

Entry Table Items	
Hollerith Item	2510
Transmission Code Item	2515
Integer Item	2500
Fixed Point Item	2505
Floating Point Item	2525
Status Item	2520
Boolean Item	2520
Dual Item	2530
	2540
	2535

3.3.3 Defined Entry Table Strings

Define all types of Defined Entry Table Strings within the following Defined Entry Table types.

Classification
Number

DDI-NO

3.3.3.1	TABLE	Name	V	int-1	-	M	int-2	\$	
3.3.3.1.1	STRING	Name	floating item	int-3	int-4				3600
	N	int-5	int-6	\$					3605
3.3.3.1.2	STRING	Name	integer item	int-3	int-4				
	N	int-5	int-6	\$					
3.3.3.2	TABLE	Name	V	int-1	S	N	int-2	\$	
3.3.3.2.1	STRING	Name	hollerith item	int-3	int-4				3610
	N	int-5	int-6	\$					
3.3.3.2.2	STRING	Name	status item	int-3	int-4				
	N	int-5	int-6	\$					3615
3.3.3.3	TABLE	Name	V	int-1	P	D	int-2	\$	
3.3.3.3.1	STRING	Name	transmission code item	int-3					
	int-4	D	int-5	int-6	\$				3620
3.3.3.3.2	STRING	Name	boolean item	int-3	int-4				
	D	int-5	int-6	\$					3625

Classification
Number

DDI-NO

3.3.3.3.4	TABLE Name R int-1 - - int-2 \$	
3.3.3.3.4.1	STRING Name fixed item int-3 int-4 - int-5 int-6 \$	3630
3.3.3.3.4.2	STRING Name dual item int-3 int-4 - int-5 int-6 \$	3635
3.3.3.3.5	TABLE Name R int-1 S M int-2 \$	
3.3.3.3.5.1	STRING Name transmission code item int-3 int-4 M int-5 int-6 \$	3640
3.3.3.3.5.2	STRING Name boolean name int-3 int-4 M int-5 int-6 \$	3645
3.3.3.3.6	TABLE Name R int-1 P - int-2 \$	
3.3.3.3.6.1	STRING Name integer item int-3 int-4 - int-5 int-6 \$	3650
3.3.3.3.6.2	STRING Name hollerith item int-3 int-4 - int-5 int-6 \$	3655
3.3.3.3.7	TABLE Name V int-1 P - int-2 \$	
3.3.3.3.7.1	STRING Name integer item int-3 int-4 D int-5 int-6 \$	3660
3.3.3.3.7.2	STRING Name integer item int-3 int-4 D int-5 int-6 \$	3660
Summary of item types used in String definitions.		
Hollerith Items		
Transmission Code Item		
Integer Item		3655
Fixed Point Item		3640
Floating Point Item		3605
Status Item		3630
Boolean Item		3600
Dual Item		3615
		3625
		3635
		3645
		3660

3.4 Arrays

3.4.1 Array Definitions

Define Arrays of the following types.

<u>Classification Number</u>		<u>Classification</u>	<u>DDI-NO</u>
3.4.1.1	ARRAY	int-1 item description \$	3535 3545
3.4.1.2	ARRAY	int-1 int-2 item description \$	3500 3505
3.4.1.3	ARRAY	int-1 int-2 int-3 item description \$	3510 3520 3515 3525 3530 3540 3545

3.4.2 Array Items

Define Preset and reference all item types within the following Array types.

<u>Classification Number</u>		<u>Classification</u>	<u>DDI-NO</u>
3.4.2.1	ARRAY	int-1 integer item \$	3545
3.4.2.2	ARRAY	int-1 int-2 integer item \$	3500 3545
3.4.2.3	ARRAY	int-1 int-2 int-3 integer item \$	3545
3.4.2.4	ARRAY	int-1 int-2 floating item \$	3505
3.4.2.5	ARRAY	int-1 int-2 int-3 status item \$	3510
3.4.2.6	ARRAY	int-1 int-2 hollerith item \$	3515
3.4.2.7	ARRAY	int-1 hollerith item \$	3520
3.4.2.8	ARRAY	int-1 int-2 int-3 boolean item \$	3525
3.4.2.9	ARRAY	int-1 int-2 dual item \$	3530
3.4.2.10	ARRAY	int-1 int-2 fixed item \$	3535
3.4.2.11	ARRAY	int-1 int-2 int-3 transmission code item	3540

3.5 Switches

Validate switch usage by defining a switch and then referencing it.

Classification Number		DDI-NO
3.5.1	ITEM SWITCH	
	Validate the usage of item switches using various item types and sequence designators.	
3.5.1.1	Integer Item Switch, Statement-Name	3900 3910 3940
3.5.1.2	Fixed Item Switch, Statement-Name	3905
3.5.1.3	Hollerith Item Switch, Statement-Name	3910
3.5.1.4	Floating Point Item Switch, Statement-Name	3915
3.5.1.5	Transmission Item Switch, Statement-Name	3920
3.5.1.6	Dual Item Switch, Statement-Name	3925
3.5.1.7	Status Item Switch, Statement-Name	3930
3.5.1.8	Boolean Item Switch, Statement-Name	3935
3.5.2	INDEX SWITCH	
3.5.2.1	Index Switch, Statement-Name	3940
3.5.2.2	Index Switch, Statement-Name	3945
3.5.2.3	Index Switch, Index Switch	3950
3.5.2.4	Index Switch, Statement-Name	3955
3.5.2.5	Index Switch, Statement-Name	3960
3.5.2.6	Index Switch, Close-Name	3965

4. SPECIAL DATA REFERENCING

4.1 BIT

Validate BIT referencing for the following variable types and one or two component indices.

<u>Classification Number</u>		<u>DDI-NO</u>
4.1.1	BIT (\$ two component index \$(integer item)	4000
4.1.2	BIT (\$ one component index \$(fixed point item)	4005
4.1.3	BIT (\$ two component index \$(status item)	4010
4.1.4	BIT (# one component index \$(boolean item)	4015

4.2 BYTE

Validate BYTE referencing for the following variable types and one or two component indices.

<u>Classification Number</u>		<u>DDI-NO</u>
4.2.1	BYTE (\$ two component index \$(transmission item)	4080
4.2.2	BYTE (\$ two component index \$(table hollerith item)	4085
4.2.3	BYTE (\$ one component index \$(hollerith item)	4090
4.2.4	BYTE (\$ two component index \$(table transmission item)	4095

4.3 CHAR

This feature is machine dependent and will not be tested here.

4.4 ENTRY and ENT

Validate ENTRY referencing within the indicated table type and forms of the functional modifier.

<u>Classification Number</u>		<u>DDI-NO</u>
4.4.1	ENTRY	
4.4.1.1	Within an IF statement	4120

Classification Number		DDI-NO
4.4.1.2	Within an IF statement	4122
4.4.1.3	Within an Assignment statement	4124
4.4.1.4	Within an Exchange statement	4126
4.4.1.5	Within IFEITH and ORIF statements	4128

Use the following defined table type in subsequent tests.

TABLE Name R int-1 S - \$

Use the following forms of the ENTRY and ENT modifiers.

- 1 ENTRY(table-name(\$ one component index \$))
- 2 ENTRY(table-item-name(\$ one component index \$))
- 3 ENT(table-name(\$ one component index \$))
- 4 ENT(table-item-name(\$ one component index \$))

4.4.2 ENT

Classification Number		DDI-NO
4.4.2.1	Within an IF statement	4130
4.4.2.2	Within an IF statement	4132
4.4.2.3	Within an Assignment statement	4134
4.4.2.4	Within an Exchange statement	4136
4.4.2.5	Within IFEITH and ORIF statements	4138

Use the following table types in subsequent tests.

4.4.3 ENTRY

Classification Number							DDI-NO
4.4.3.1	TABLE	Name	V	int-1	S	-	4140
4.4.3.2	TABLE	Name	V	int-1	P	-	4142
4.4.3.3	TABLE	Name	V	int-1	-	-	4144
4.4.3.4	TABLE	Name	R	int-1	S	-	4146
4.4.3.5	TABLE	Name	R	int-1	P	-	4148
4.4.3.6	TABLE	Name	R	int-1	-	-	4150

4.4.4 ENT

Classification Number							DDI-NO
4.4.4.1	TABLE	Name	V	int-1	S	-	4152
4.4.4.2	TABLE	Name	V	int-1	P	-	4154
4.4.4.3	TABLE	Name	V	int-1	-	-	4156
4.4.4.4	TABLE	Name	R	int-1	S	-	4158
4.4.4.5	TABLE	Name	R	int-1	P	-	4160
4.4.4.6	TABLE	Name	R	int-1	-	-	4162

4.5 PRIME LOC

Validate referencing with 'LOC.

Classification Number							DDI-NO
4.5.1	'LOC	(program-name)					4175 4196 4199
4.5.2	'LOC	(simple item-name)					4178
4.5.3	'LOC	(table-name)					4181 4193
4.5.4	'LOC	(table-item-name)					4181 4193

<u>Classification Number</u>		<u>DDI-NO</u>
4.5.5	'LOC (array-item-name)	4184
4.5.6	'LOC (string item-name)	4187
4.5.7	'LOC (statement-name)	4190 4193

4.6 MANT

This feature is machine dependent and will not be tested here.

4.7 NENT

Validate NENT referencing for the following table types.

<u>Classification Number</u>		<u>DDI-NO</u>
4.7.1	NENT (Ordinary table-name)	
4.7.1.1	TABLE name R int-1 S - \$	4200
4.7.1.2	TABLE name R int-1 P - \$	4205
4.7.1.3	TABLE name V int-1 S - \$	4210
4.7.1.4	TABLE name V int-1 P - \$	4215
4.7.1.5	TABLE name V int-1 - - \$	4220
4.7.1.6	TABLE name V int-1 - - \$	4225
4.7.2	NENT (Defined Entry table-name)	
4.7.2.1	TABLE name V int-1 S int-2 \$	4230
4.7.2.2	TABLE name V int-1 P int-2 \$	4235

4.8 NWDSEN

Validate NWDSEN referencing for the following table types.

Classification Number							DDI-NO
4.8.1	TABLE	name	V	int-1	S	-	4300
4.8.2	TABLE	name	V	int-1	P	-	4305
4.8.3	TABLE	name	R	int-1	S	-	4310
4.8.4	TABLE	name	V	int-1	-	-	4315

4.9 ODD

Validate referencing with ODD.

Classification Number							DDI-NO
4.9.1	ODD	(integer variable)					4340
4.9.2	ODD	(fixed variable)					4345
4.9.3	ODD	(loop variable)					4350

4.10 POS

This is an I/O concept and will not be tested.

4.11 ALL

Validate the use of ALL in a FOR loop statement.

Classification Number							DDI-NO
4.11.1	ALL						4390

5. PROGRAM ORGANIZATION

5.1 PRIME PROGRAM

Test the ability of the compiler to origin programs correctly.

<u>Classification Number</u>		<u>DDI-NO</u>
5.1.1	'PROGRAM name octal constant	4196 4175
5.1.2	'PROGRAM name decimal constant	4199 4175

5.2 Procedures

5.2.1 User Defined Procedures

Check the usage of user defined procedures.

<u>Classification Number</u>		<u>DDI-NO</u>
5.2.1.1	PROC name \$	4450 4465
5.2.1.1.2	PROC name (input-parameter list) \$	
	Input Parameter List - Variable Reference	4470
5.2.1.1.3	PROC name (= output parameter list) \$	
	Output Parameter List - Table Reference	4475
5.2.1.1.4	PROC name (input parameter list = output parameter list) \$	
	Input Parameter List - Variable Reference	4455 4485
	Input Parameter List - Array References	4490
	Input Parameter List - Table References	4480
	Output Parameter List - Formula References	4495
	Output Parameter List - Variable References	4460 4485

<u>Classification Number</u>		<u>DDI-NO</u>
	Output Parameter List - Array Reference	4480
	Output Parameter List - Table Reference	4490

5.2.2 Language Defined Procedure

Check the usage of the language defined procedure, REMQUO.

<u>Classification Number</u>		<u>DDI-NO</u>
5.2.2.1	REMQUO (integer item-1 , integer item-2)	4770
5.2.2.2	REMQUO (integer item-1 , integer item-2)	4775
5.2.2.3	REMQUO (integer item-1 , integer item-2)	4780
5.2.2.4	REMQUO (integer constant-1 , integer-constant-2)	4785

5.3 Functions

5.3.1 User Defined Functions - PROC

Check the usage of user defined functions.

<u>Classification Number</u>		<u>DDI-NO</u>
5.3.1.1	PROC name \$	
	Function Type	
	Boolean	4805
	Integer	4810
	Hollerith	4820
	Dual	4845

Classification
Number

5.3.1.2

PROC name (input parameter list) \$

Function Type

Boolean

Integer

Transmission

Floating

Fixed

Input Parameter List

Boolean Formula

Integer

Table

Array

Floating

DDI-NO

4800 4830 4840

4810 4815

4825

4830

4835

4800

4810 4830 4835 4840

4825

4825

4830

5.3.2 Language Defined Functions, ABS and REM

Check the usage of the language defined functions ABS and REM.

Classification
Number

5.3.2.1

ABS (integer item)

5.3.2.2

integer = ABS (integer item)

5.3.2.3

REM (integer item-1, integer item-2)

5.3.2.3.1

REM (integer item-1, integer item-2)

5.3.2.3.2

REM (integer item-1, integer item-2)

5.3.2.3.3

REM (integer constant-1, integer constant-2)

DDI-NO

5100

5100

5105

5110

5115

5120

5.3.3 User Defined Function - CLOSE

Check the usage of the user defined function, CLOSE.

<u>Classification Number</u>	<u>DDI-NO</u>
5.3.3.1 CLOSE	5160

5.4 RETURN

Check the usage of the RETURN feature.

<u>Classification Number</u>	<u>DDI-NO</u>
5.4.1 RETURN from a procedure	5180
5.4.2 RETURN from a used defined function	5185
5.4.3 RETURN from a close	5190

6. PROGRAM CONTROL

6.1 GOTO

Check the usage of the GOTO statement. Since most modules use the GOTO statement, no special modules will be devoted to testing this feature. Instead, references to modules using this feature will be given.

<u>Classification Number</u>	<u>DDI-NO</u>
6.1.1 GOTO statement-name \$	4162
6.1.2 GOTO close-name \$	5160
6.1.3 GOTO item-switch name \$	3900
6.1.4 GOTO index-switch name \$	3945

6.2 STOP

Because of a possible conflict with the operating system, this feature will not be tested.

6.3 IF Clause

Check the usage of the IF clause.

<u>Classification Number</u>		<u>DDI-NO</u>
6.3.1	IF statement followed by simple statement. This version of the IF is used in various modules. No special module will be devoted to its testing.	
6.3.2	IF statement followed by compound statement	5280

6.4 IFEITH, ORIF

Check the usage of the IFEITH and ORIF for various item types.

<u>Classification Number</u>		<u>DDI-NO</u>
6.4.1	Boolean Items	5310
6.4.2	Integer Items	1445
6.4.3	Floating Items	1450
6.4.4	Status Items	1455
6.4.5	Transmission Items	1460
6.4.6	Mixed Data Items	5805

6.5 FOR Loops

Check the usage of the various forms of the FOR loop.

Classification Number		DDI-NO
6.5.1	Single FOR loops - Constant Factors	
6.5.1.1	One Factor FOR - Incrementing	5340
6.5.1.2	Two Factor FOR - Incrementing	5342
6.5.1.3	Three Factor FOR - Incrementing	5344
6.5.1.4	Three Factor FOR - Incrementing	5346
6.5.1.5	One Factor FOR - Decrementing	5348
6.5.1.6	Two Factor FOR - Decrementing	5350
6.5.1.7	Three Factor FOR - Decrementing	5352
6.5.1.8	Three Factor FOR - Decrementing	5354
6.5.2	Nested or Multiple FOR loops - Constant Factors	
6.5.2.1	One Factor FOR within Three Factor FOR	5356
6.5.2.2	Two Factor FOR within Three Factor FOR	5358
6.5.2.3	Two Factor FOR and Three Factor FOR	5360
6.5.2.4	Two Factor FOR and Three Factor FOR	5362
6.5.2.5	Three Factor FOR with Three Factor FOR	5364
6.5.3	FOR loops - Non Constant Factors	
6.5.3.1	Three Factor FOR - Variable First Factor	5366
6.5.3.2	Three Factor FOR - Variable Second Factor	5368
6.5.3.3	Three Factor FOR - Formula First Factor	5370
6.5.3.4	Three Factor FOR - Formula Second Factor	5372

6.6 Loop Control

Check the operation of the TEST statement under the following FOR loop conditions.

Classification Number		DDI-NO
6.6.1	Three Factor FOR	5390
6.6.2	Two Factor FOR	5392
6.6.3	Loop Variable within Loop Variable	5394
6.6.4	Loop Variable within Loop Variable	5396

7. PROCEDURE FORMATION

7.1 Numeric Expression

Classification Number		DDI-NO
7.1.1	Arithmetic Operations	
7.1.1.1	Integer Variables	5400
7.1.1.2	Fixed Point Variables	5405
7.1.1.3	Floating Point Variables	5410
7.1.2	Unary Operators	
7.1.3	Multiple Operator Expressions	
7.1.3.1	Integer Variables (+,*)	5425
7.1.3.2	Fixed Point Variables (+,*)	5430
7.1.3.3	Floating Point Variables (+,*)	5435
7.1.3.4	Integer Variables (*,/,+)	5440
7.1.3.5	Fixed Point Variables (*,/,+)	5445
7.1.3.6	Floating Point Variables (*,/,+)	5450
7.1.3.7	Integer Variables (+,-,*,/,**)	5455
7.1.3.8	Fixed Point Variables (+,-,*,/,**)	5460
7.1.3.9	Floating Point Variables (+,-,*,/,**)	5465
7.1.4	Precedence of Operations	
7.1.4.1	Bracketed Addition	5470
7.1.4.2	Integer Negation	5475
7.1.4.3	Negative Number Exponentiation	5480
7.1.5	Dual Operations	
7.1.5.1	Integer Variables (+,-,*,/)	5485
7.1.5.2	Integer Variables (+,*,/)	5490
7.1.5.3	Fixed Point Variables (+,*,/)	5495
7.1.5.4	Floating Point Variables (+,*,/)	5500
7.1.5.5	Integer Variables (-,*,/,**)	5505
7.1.5.6	Fixed Point Variables (+,-,*,/,**)	5510
7.1.5.7	Floating Point Variables (+,-,*,/,**)	5515

Classification Number		DDI-NO
7.1.6	Precedence in Dual Expressions	
7.1.6.1	Bracketed Division	5520
7.1.6.2	Bracketed Division	5525
7.1.6.3	Bracketed Division	5530
7.1.6.4	Precedence of Multiplication	5535
7.1.6.5	Precedence of Negated Constant	5540
7.1.6.6	Precedence of Negated Constant	5545

7.2 Simple Comparisons

Check the use of comparisons under the following conditions.

Classification Number		DDI-NO
7.2.1	Relational Operators - Integer Variables	5800
7.2.2	Relational Operators - Fixed Variables	5805
7.2.3	Relational Operators - Floating Variables	5810
7.2.4	Relational Operators - Dual Variables	5815
7.2.5	Relational Operators - Integral Variables and Octal Constants	5820
7.2.6	Relational Operators - ENT and ENTRY	5825
7.2.7	Equality and Inequality - STATUS Variables	5830
7.2.8	Equality and Inequality - Hollerith Variables	5835
7.2.9	Equality and Inequality - Transmission Variables	5840

7.3 Chained Comparisons

Check the use of chained comparisons.

<u>Classification Number</u>		<u>DDI-NO</u>
7.3.1	Integer Variables	6000
7.3.2	Fixed Variables	6005
7.3.3	Floating Variables	6010
7.3.4	Dual Variables	6015
7.3.5	Hollerith Variables	6020
7.3.6	Transmission Variables	6025
7.3.7	Octal Constants	6030

7.4 Boolean Expressions

Check the usage of NOT, AND and OR in the development of Boolean expressions.

<u>Classification Number</u>		<u>DDI-NO</u>
7.4.1	NOT	6125 6130 6135
7.4.2	AND	5810 5815 6110 6115 6135
7.4.3	OR	5820 6100 6105 6120 6135

8. REPLACEMENT STATEMENTS

8.1 Assignment

Module 6200 contains the following Assignment statement variations:

1. Numeric Assignment
2. Dual
3. Literal
4. Boolean
5. Status
6. Entry

8.2 EXCHANGE

Check the use of the EXCHANGE statement in the following situations.

Classification Number		DDI-NO
8.2.1	Integer Variable = = Integer Variable	6400
8.2.2	Fixed Variable = = Fixed Variable	6405
8.2.3	Hollerith Variable = = Hollerith Variable	6410
8.2.4	Dual Variable = = Dual Variable	6415
8.2.5	Transmission Variable = = Transmission Variable	6420
8.2.6	Boolean Variable = = Boolean Variable	6425
8.2.7	Status Variable = = Status Variable	6430
8.2.8	Table Integer Variable = = Table Integer Variable	6435
8.2.9	Table Fixed Variable = = Table Fixed Variable	6440
8.2.10	Table Hollerith Variable = = Table Hollerith Variable	6445
8.2.11	Table Dual Variable = = Table Dual Variable	6450
8.2.12	Table Transmission Variable = = Table Transmission Variable	6455
8.2.13	Table Boolean Variable = = Table Boolean Variable	6460
8.2.14	Table Status Variable = = Table Status Variable	6465
8.2.15	Table ENTRY Variable = = Table ENTRY Variable	6470
8.2.16	Table ENT Variable = = Table ENT Variable	6475

9. COMPILER DIRECTING CONCEPTS

9.1 DEFINE

Check the usage of the DEFINE compiler directive. DDI-No. - 6500, Module - 6400

9.2 LIKE

Test the ability of compiler to define LIKE tables.

Classification Number		DDI-NO
9.2.1	LIKE - Ordinary Tables	6600 6610
9.2.2	LIKE - Defined Tables	6605

9.3 OVERLAY

Define and check that OVERLAY's perform as stated in AFM 100-24.

Classification Number		DDI-NO
9.3.1	OVERLAY IDS-1 = IDS-2 = , . . . IDS-n \$	
9.3.1.1	OVERLAY item-name-1 = item-name-2 \$	6700
9.3.1.2	OVERLAY item-name = table-name \$	6705
9.3.1.3	OVERLAY item-name = array-name \$	6710
9.3.1.4	OVERLAY table-name = item-name-1, item-name-2 \$	6715
9.3.1.5	OVERLAY table-name-1 = table-name-2 \$	6720
9.3.1.6	OVERLAY table-name-1 = table-name-2 \$	6725
9.3.1.7	OVERLAY array-name-1 = array-name-2 \$	6730
9.3.1.8	OVERLAY array-name = table-name \$	6735
9.3.1.9	OVERLAY table-name = array-name-1, array-name-2 \$	6740
9.3.1.10	OVERLAY table-name-1 = table-name-2, table-name-3 \$	6745
9.3.2	OVERLAY octal constant = IDS-1 = IDS-2 = . . . IDS-n \$	
9.3.2.1	OVERLAY octal constant = table-name = item-name	6750

Classification Number		DDI-NO
9.3.2.2	OVERLAY octal constant = item-name-1 = item-name-2 \$	6755
9.3.2.3	OVERLAY octal constant = array-name = item-name \$	6760
9.3.2.4	OVERLAY octal constant = table-name-1 = table-name-2 \$	6765
9.3.2.5	OVERLAY octal constant = array-name-1 = array-name-2 \$	6770
9.3.2.6	OVERLAY octal constant = table-name = array-name \$	6775
9.3.3	OVERLAY number = IDS-1 = IDS-2 = IDS-n \$	
9.3.3.1	OVERLAY number = table-name = item-name \$	6780
9.3.3.2	OVERLAY number = item-name-1 = item-name-2 \$	6785
9.3.3.3	OVERLAY number = array-name = item-name \$	6790
9.3.3.4	OVERLAY number = table-name-1 = table-name -2 \$	6795
9.3.3.5	OVERLAY number = array-name-1 = array-name -2 \$	6800
9.3.3.6	OVERLAY number = array-name = table-name \$	6805

9.4 MODE

This feature instructs the compiler to retain a data item according to a specified set of item descriptors. One of the assumptions made in the development of the Population File is that no check would be made of the form in which an item is stored by the system. A check of the MODE feature would require such a check. Consequently, this feature will not be tested.

10. INPUT/OUTPUT CONCEPTS

Because of the non-standard character of these features, no Input/Output tests will be performed.

KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
JOVIAL J-3 (J3) compiler validation						

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